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UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

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JENNIFER S. FISCHMAN,
Plaintiff,
-against-
Index No. 18-cv-08188

MITSUBISHI CHEMICAL HOLDINGS, AMERICA, INC.; MITSUBISHI CHEMICAL CORPORATION; MITSUBISHI CHEMICAL HOLDINGS CORPORATION; NICHOLAS OLIVA, in his individual processional capacities; DONNA COSTA, in her individual and professional capacities; and JOHN DOES 1-10, in their individual and professional capacities,

Defendants.

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October 7, 2021
10:11 a.m.

DEPOSITION of GERALD LaPORTE, a Non-Party witness herein, taken by the attorneys for the respective parties, pursuant to Notice, held via web conference at the above date and time before Toni Musacchia, a Stenotype Reporter and Notary Public within and for the State of New York.

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APPEARANCES:

VALLI KANE & VAGNINI LLP
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BY: NICOLE GUERON, ESQ.

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One Battery Park Plaza, 28th Floor
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BY: BRITTANY L. PRIMAVERA, ESQ.
and
MERCEDES COLWIN, ESQ.

SHEARMAN & STERLING, LLP
Attorneys for Defendant,
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599 Lexington Avenue
New York, New York 10222
BY: SAM JOLLY, ESQ.

ALSO PRESENT:
Jennifer Fischman

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FEDERAL STIPULATIONS

IT IS HEREBY STIPULATED AND AGREED by and between the parties hereto, through their respective Counsel, that the certification, sealing and filing of the within examination will be and the same are hereby waived;

IT IS FURTHER STIPULATED AND AGREED that all objections, except as to the form of the question, will be reserved to the time of the trial;

IT IS FURTHER STIPULATED AND AGREED that the within examination may be signed before any Notary Public with the same force and effect as if signed and sworn to before this Court.

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THE REPORTER: It is hereby stipulated and agreed by and between counsel for all parties present that pursuant to Federal Rule of Civil Procedure 28 (a)(2), this deposition is being conducted remotely and that the court reporter shall be permitted to administer the oath to the witness via videoconference. The witness and all counsel are in separate remote locations and participating via Zoom, telephone or any web conference meeting platform under the control of Bee Reporting Agency, Inc.

It is further stipulated that this videoconference will not be recorded in any manner and that any recording without the express written consent of all parties shall be considered unauthorized, in violation of law and shall not be used for any purpose in this litigation or otherwise.

Before I swear in the witness, I will ask each counsel to stipulate on the record that I, Toni Musacchia, the court reporter, may swear in the witness even though I am not physically in the presence of the

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witness and that there is no objection to that at this time, nor will there be an objection at a future date.

MR. BERMAN: So stipulated.

MS. PRIMAVERA: So stipulated.

MS. GUERON: So stipulated.

MR. JOLLY: So stipulated.

THE REPORTER: Ms. Primavera, can you represent that to the best of you knowledge and belief, that the witness appearing today via web conference is, in fact, Gerald LaPorte?

MS. PRIMAVERA: Yes, I can.

GERALD LAPORTE,

the witness herein, having first been duly sworn by Toni Musacchia, a Notary Public in and for the State of New York, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BERMAN:

Q. Please state your name for the record.

A. Gerald LaPorte.

Q. Please state your address for the record.

A. 16106 Swan Mountain Drive, Broomfield, Colorado 80023.

Q. Mr. LaPorte, good morning, my name is Mathew Berman, I'm counsel for Plaintiff, Jennifer Fischman, in this action.

Today I will be asking you a series of questions, which you'll be responding to having sworn to tell the truth.

If you don't hear one of my questions, please let me know. I'm potentially able move closer to the microphone or to make it louder in some other way to make myself more audible.

If you don't understand one of my questions, please let me know and I'll do my best to rephrase it a different way to make it more understandable.

If you do answer my question, I'll take that to mean that you understood my question.

It's important today, as you know, to give verbal responses because we have a court reporter present and she cannot take down gestures.

I will do my best to let you finish your answer completely before I move on to a new question and I would request that you also do

your best to let me get my entire question out even if it's clear to you what I'm going to be asking you because we want to have a clear transcript.

From time to time we may have objections from one of the attorneys. Unless you're instructed not to answer the question by one of the attorneys, I will still expect you to provide a response.

That being said, it's not my intention today to ask you about any privileged communications that you've had with counsel in connection with matter.

Do you understand that you're under oath today as if you're in a court of law even though we're in an informal setting?

A. Yes, sir.

Q. Do you understand the other items that I set forth already?

A. Yes, sir.

Q. Are you currently taking any medication which could impact your ability to testify truthfully or accurately today?

A. I am not.

Q. Are you currently under any medical condition which could affect your ability testify truthfully and accurately today?

A. I am not.

Q. Do you suffer from my medical condition which impairs your memory?

A. I do not.

Q. You've been deposed a number of times before, correct?

A. Yes, sir.

Q. So I think you're used to the rules of the road but if that's any questions that you have about the procedure, please let me know and I'll be happy to take a break.

From time to time you may wish to take a break. If you wish to take a break at any time, that's totally fine. I just request if there's a question pending, you answer that question before I move to take on any breaks.

I anticipate that we'll take breaks from time to time apart from that and we'll just take it as we go.

Did you conduct any preparation in connection with today's testimony?

A. I did.
Q. How much time did you spend preparing?
A. I don't know exactly but maybe about three -- three to four hours.
Q. As part of your preparation, did you have any interactions with counsel for the Defendants in this matter?
A. Yes.
Q. Do you know how much time you spent interacting with counsel for the Defendants in order to prepare for today's deposition?
A. Once again, not exactly. I don't have my records in front of me but maybe 30 minutes to 45 minutes.
Q. Okay. You spent other -- without getting into the material that you discussed -- you have spent other time working with counsel in connection with this matter, right?
A. With respect to preparation or prior to -- prior to the notification that there was going to be a deposition?
Q. Let me try to make my question more clear.
What I'm trying to ascertain is how much of

the time you have recorded for preparing for today's deposition, just today's deposition, how much of that time was spent working with other counsel in this matter?
A. About 30 to 45 minutes. I'm trying to think if there was -- if I spoke on the phone previously. But I would say probably not much more than an hour total, if there was another time that I spoke on the phone.
Q. Setting aside your time with counsel -- I'm not asking about any of the subject matter that you interacted with counsel -- but setting that aside, what other preparation did you do in connection with today's deposition?
A. I reviewed -- I reviewed my report and then I also reviewed my file and all of my notes. Also, I took a number of -- I captured number of images like photographs, digital scans. So I went overall of that a well, which I would consider part of my file.
Q. That material that you have just identified, is that contained within your report?
A. Some of it is in my report. But I would say, you know, a good part of like my written

notes -- I would say that everything in my report or what's in my report is a fairly good summary of all of my notes.
Q. You're testifying in this case as an expert under the federal rules of civil procedure, do you have a general understanding of how that works?
A. Yes.
Q. So you're supposed to provide us in your expert report with a number of items including all of the facts upon which you relied to draw your opinions and conclusions, do you understand that?
A. Yes.
Q. So the material that you just described, have you relied upon that in formulating your opinions and conclusions in this matter?
A. I would say that -- like I said, I think most of my materials that I reviewed or that I just mentioned are incorporated into my report and then I have a section in my report where I discuss all of the testing and examinations that I preformed and the reasons and bases for those. So I would say that a lot of that, you know, sums

up what's in my notes.
Q. So we're going to get to that momentarily.
Do you have any opinions or conclusions with respect to this matter that are not contained within your report?
A. No.
MR. BERMAN: Toni, the first e-mail I sent you, the large attachment, can we pull it up on the screen, please.
Can everyone see this clearly on the screen?
Q. Do you need us to shrink it down a little?
A. I can see it just fine.
Q. Okay.
MR. BERMAN: Can we mark this please as LaPorte Exhibit 1.
(LaPorte Exhibit 1, marked for identification.)
Q. Mr. LaPorte, is there a preferred title that you use; is it Mr. or doctor, what do you prefer?
A. Whatever you prefer. You can call me --

Q. What do you go by? What should I call you today?
A. Jerry, Gerald, Mr. LaPorte.
Q. We'll go with Mr. LaPorte.
Mr. LaPorte, do you recognize this document right?
A. I do, yes.
Q. This is the expert report you created in this matter, correct?
A. It's the first page.
MR. BERMAN: Toni, can you please page through the document to the witness' satisfaction so he can satisfy himself this is the report he prepared.
THE WITNESS: What would be best, I think, if you can just go to the signature page so I can see my signature at the end.
MR. BERMAN: Toni, can you please scroll down to page 24.
THE WITNESS: Yes. To answer your question, this is my report.
MR. BERMAN: Can we now turn to page seven.
Q. Mr. LaPorte, this page at the top where

it says "Summary of opinions" and continuing through the next page.
Does this itemize your opinions and conclusions with respect to this matter?
A. I believe so. I mean, I would say that I usually -- I mean, my full opinions are in my conclusions are at the opinion section at the end. But, yeah, I think this is a good summary of my opinions.
Q. Are there any other opinions not contained in your report which you intend to present at trial if you're called upon?
A. I don't believe so. Can I just read -- I don't need to read everything -- can I just browse the subsections, the 20 (a), (b), (c) and what's on the back?
Q. Absolutely. Please direct the court reporter and let me know when you're done.
THE WITNESS: Can we go to the next page?
I believe we may be missing something that would be in the final page, which had to do with the indentations of the two entries on Bates-stamped 788.

Q. Are you referring to something in your conclusions that is not in the summary?
A. Yes, that's -- unless I missed it.
THE WITNESS: Can we go back up to (c)? I apologize.
Yeah, if we go to the conclusion section at the end I believe there's one point missing.
MR. BERMAN: Toni, can you jump to page 23 or 24, please.
THE WITNESS: Yes, it would before paragraph 46 and then (d) in here, the two entries -- (d) beginning the two entries reading "corp. (Plus Aldila Inc.) -- it's number (d) in here, that's not in the summary. So this is the idea that the two entries from Q1 were executed over top of -- actually, I apologize but that Q8 is in error, it should read Q12.
Q. So the Q8 bottom of page 23 should be Q12?
A. Yes.
THE WITNESS: Can we go down to the next -- can we split so we're looking at the

bottom of page 23 and the top of page 24. There we go.
Yes, so I do apologize, it was typographic error. So Q8 should actually read Q12.
Q. With that in mind, are all of the opinions and conclusions that you intend to offer at trial contained within this document?
A. Yes.
Q. Let's go back to page seven of the report. Let's start with conclusion in 20(a).
In conclusion 20(a) you state that, "It is highly probable that the handwritten entries on both sides of Q8 were not executed on the purported date of March 1, 2016," correct?
A. Correct.
Q. Now you got a footnote there citing to the Scientific Working Group For Forensic Document Examiners: Standard Terminology for Expressing Conclusions of Forensic Document Examiners. Do you see that footnote?
MR. BERMAN: Can you scroll down a little bit, Toni, so he can see the footnote.

Q. By the way, if you happen to have a physical copy of the report handy or on your computer, I don't object to you reviewing it if that's more expeditious for you, okay?

A. I do have a copy in front of me -- a copy of my report in front of me so I can read that.

Q. That's fine.

A. I'm trying not to sort of strain by looking at the screen.

Q. I understand and that's totally fine. I'm fine with that. But if you have any other documents that you're referring to, I would need to know that you' reviewing them.

A. Of course, yes. Of course.

Q. Do you have any other documents in front of you other than your expert report?

A. I mean, I have my file but it's kind of off to the side here.

Q. You're not presently referring to any documents other than your expert report?

A. No, just my expert report is right in front of me.

Q. If you wish to review something then

please let me know and we can talk about that. But otherwise if you're reading from a document or reviewing a document, other than your expert report, I need to know that.

A. Absolutely, of course.

Q. Thank you. So the footnote at the bottom here; do you see that footnote, footnote one?

A. Yes.

Q. So this citation that you got to the Scientific Working Group Standard Terminology For Expressing Conclusions, that's a terminological guideline, correct?

A. It's a standard for terminology for expressing conclusions.

Q. So that's informing the language used to articulate an opinion or conclusion, correct?

A. As well as a definition of what those -- what that terminology means.

Q. Okay. But when you're using the phrase "highly probable" here that's a terminology -- that's a use of terminology, it not an empirical standard, correct?

MS. PRIMAVERA: Objection.

A. It's a standard that's used by the forensic document examiner community.

Q. But do you agree it's a standard for the use of terminology?

MS. PRIMAVERA: Objection.

MS. GUERON: Objection.

A. It's standard for terminology for expressing conclusions. There is another standard that we have that's for other terminology but this is terminology for expressing conclusions.

Q. Okay. So when you use the term "highly probable," you're using that as terminology to express your view of evidence that is very persuasive and where the examiner is virtually certain but there is some factor that precludes absolute certainty with respect to a conclusion, right?

MS. COLWIN: Objection.

MS. PRIMAVERA: Objection.

MS. GUERON: Objection.

MR. BERMAN: Guys, if you want to object, you can but maybe one of you can give an objection rather than the three of

you.

THE WITNESS: That's correct, that's the definition in the footnote that I put in there.

Q. That definition comes from that Scientific Working Group, Forensic Document Examiners terminology document, correct?

A. Just to be clear, the terminology for expressing conclusions, yes.

Q. Okay. Now, you continue on in subparagraph 20(a) and you state that you performed a chemical analysis to measure the amount of a volatile organic compound referred to as T -- sorry, referred to as 2-phenoxyethanol and in parenthesis you refer to that as 2-PE, closed parenthesis.

A. Can I correct your pronunciation.

Q. Yes, please.

A. It's phenoxyethanol.

Q. Phenoxyethanol.

A. I'm happy to call it 2-PE from this point forward -- for the court reporter also.

Q. Perfect. So we'll have an understanding that when you use the term 2-PE, we're referring

to 2-phenoxyethanol, good?
A. Yes.
Q. Okay. So it continues on here in your summary of opinions to state "The level of 2-PE stabilize over a period of approximately six to eighteen months as an ink goes through a complex drying process and is not significant much beyond two years after the ink has been applied to paper. However, the levels of 2-PE were extremely high, along with other test results, which are consistent with an ink that is still in a very fresh stage, e.g., less than six months old," right?
A. Correct.
Q. So what makes this a complex drying process?
A. So the drawing process, which I explained in my report in the reasons and bases section, but to summarize that, when an ink is placed on a piece of paper it goes through a process where there is what we call crosslinking in polymerization of the ink while the solvent evaporates. And that process of drying, if you will, is multiple factors. So as an analogy, you

know, think about if you had a cut on your hand and then a scar -- or then it starts to scab and then potentially scars later. So there's a lot of different interactions that are going on that causes that cut to scab at some point in time. And the same thing goes with ink.
So the best way to describe it too is that what happens is the ink starts to harden and then it incapsulates anything that is left in the -- sort of the core of it, specifically in this 2-PE compound.
Q. Did you use the term crosslinking of polymerization?
A. Crosslinking and polymerization.
Q. When you use the term "crosslinking," what does that refer to?
A. It's kind of the molecular description of what's happening with the ink.
Q. When you use the term "polymerization," what is that referring to?
A. Hardening from a chemical perspective.
Q. When you refer to the hardening of an ink, are there different components in ink?
A. Yes.

Q. And one of those components is the PE-2?
A. So 2-PE is one of potentially other solvents or volatile organic compounds but also there are resins in ink too. And so that process with the resins in the volatile organic compounds is what creates that drying process.
Q. So if we use the term VOC for volatile organic compounds, does that make sense?
A. Yes.
Q. So within the ink there are different components. You mentioned there could be VOCs contained with the ink, there could be resins contained with ink.
Are there any other types of components of the ink?
A. There are certainly -- there are dyes and pigments in inks. So to kind of summarize that, the three main components of an ink are colorants, which could be dyes and pigments, solvents and then resins. But also there's other trace type materials that can be in the ink that may interact with that drawing process.
Q. Okay. So in the process that you described in the ink hardening, is that due to

evaporation leaving a higher amount or a higher proportion of resin in what's left?
A. Not necessarily the resin but the solvent.
Q. So the solvent itself hardens?
A. No, the solvent is part of -- it creates -- is an activator for the hardening process. The solvent is intended to -- I'll say help or assist the liquid get applied to the paper when it's wet and then once it's on the paper, the idea is for that ink to dry so it stays on there and doesn't come off. What will happen in that process is the solvents will begin to evaporate and then and all of those other complex interactions, like the polymerization that -- that hardens -- that will cause the ink to harden.
Q. Okay. And you state here that the level of 2-PE stabilizes over a period of approximately six to eighteen months as the ink goes through that complex drying process, right?
A. Yes.
Q. Okay. So what determines whether it takes six months or eighteen months or some other

period of time to harden?

A. It could depend on the formulation of the ink. So how the ink is formulated. What I mean by that is all of the -- all the mixture -- the mixture of all of the ingredients that are used in the ink. So not all ink formulations are exactly the same.

There could be, you know, how the document was stored. If it was stored in a high heat environment and then it would dry much faster.

Sometime it can depend on even the type of paper. So very smooth surfaced paper -- technically we call it highly calendared paper so it extremely smooth, thick, inks will dry -- you know, they'll dry faster from those type of materials because they don't absorb into the paper.

Q. Okay. All right now you indicate here that you performed a chemical analysis of the VOC for document Q8; did I get that right?

A. That's correct.

Q. Did you perform any other analysis of document Q8?

A. Yes.

Q. How many other analyses did you perform for document Q8?

A. I performed what I would call a visual -- I refer to as a visual examination and that's generally to identify the color of the ink, sometimes determine the type of ink and then a microscopic examination, that's to confirm the type of ink that's been used.

Then there's a series of what we call optical examinations using an instrument referred to as Video Spectral Comparator or a VSC.

Then I do what's called Thin Layer Chromatography Analysis or TLC to compare all of the inks from the different documents.

And then that leads to the Gas Chromatography Mass Spectrometry or GC/MS testing for the solvents.

Q. So we got some new terms we introduced into our discussion. Let's just have an agreement if we refer to "VSC," that's the device you used for your optical exam, is that okay?

A. Correct.

Q. If we refer to "TLC" that's your Thin

Layer Chromatography, did I get that right?

A. Correct.

Q. And if you refer to GC/MS, that's Gas Chromatography Mass Spectrometry, did I get that right?

A. Yes.

Q. Are gas chromatography and mass spectrometry one thing or are they multiple things?

A. They're actually two different technologies that work together in an integrated way to provide different information about the material being utilized.

Q. Okay. So we got for document Q8 a visual examination, a microscopic examination, an optical examination, a TLC examination and a GC/MS examination; is that correct?

A. That's correct.

Q. Were there any other examinations performed of document Q8?

A. I believe we did the physical examination on Q8, which is referred to as indentation or impression analysis and the instrument that was used for that is called an

Electrostatic Detection Apparatus, which we can refer to as an ESDA, E-S-D-A.

Q. And then with respect to document Q12, you summarize your opinions of that in paragraph 20(c); is that correct?

A. That is correct.

Q. What examinations did you perform on document Q12?

A. I would say all of the same examinations that I did for Q8.

Q. All right. Now can you tell me where you identify your physical indentation examination of document Q8 in your report?

A. Well, of course I describe it in paragraphs 26 through 31. With respect to my results, paragraph 44 and 45.

Q. Paragraph 44 doesn't seem to be describing document Q8, am I misreading it?

A. No. So if I did -- if I did not observe any impressions -- any significant impressions then I don't report them up.

Q. Okay. Then there's no -- there's no opinion or conclusion that you reached with respect to document Q8 from your physical

examination that's listed in your report?
A. With respect to the indented writing, no, there is nothing.
Q. What about your visual examination of document Q8, is that contained within your report?
A. Yes.
Q. Where can I find that?
A. So that would be -- so the visual examination often gets combined with the microscopic examination but that would all be summarized in table one, which falls under paragraph 39, when I identify the color and the type of ink.
And then also in paragraph 40, the microscopic examination -- so once again that physical examination and that microscopic examination really gets combined to a certain extent. I mean, I do it in that order specifically, I examine the document physically and then I look at it under the microscope more to confirm what I've seen physically.
Q. So with respect to document Q8 in paragraph 39 there doesn't seem to be any

conclusion that pertains particularly to Q8, right, I would have to look in the table below that?
A. Yes, the table, which Q8 would be that black -- you know, black ballpoint ink was used for the text or written entries on both pages and then a black non-ballpoint ink was used to write in the date 3/1/16.
Q. In the right-hand column where it says "writing ink formulation"?
A. Yes.
Q. And you got two different formulations listed for document Q8, right?
A. Correct.
Q. So with respect to all entries except the date, you've identified the writing ink formulation as Ink 3 black, correct?
A. Correct.
Q. What is Ink 3 black?
A. So as I described I think in the paragraph before, I do these -- I assign or designate the ink just -- a number to indicate that it is the same or different formulation from the other inks.

Q. Okay. And is that the same answer for Ink 5 black?
A. Correct.
Q. So is there any significance to the fact that this is Ink 3 black other than that Q12 also contains Ink 3 black?
A. Well, the significance is that I'm just identifying those ink formulations in terms of I could not differentiate them based on the testing that I performed.
Q. Can you explain what you mean when you say you couldn't differentiate them, what does that mean?
A. That means I couldn't differentiate them base on all of the testing that I did.
Q. Does that mean Ink 3 on document Q8 is the same as Ink 3 on Q12 or does it mean you couldn't tell the difference or something different?
A. Yeah, so we generally don't use the word "the same." The same as in chemistry means they're exactly the same in every aspect whatsoever. So we use the term "matching," so those formulations match each other, they

couldn't be differentiated based on the physical, the optical, the chemical examinations and the chemical examinations included the TLC and GC/MS testing.
Q. Okay. So I'm not sure that I understood the distinction that you drew.
I think what I understood you to say is that if we use the terminology that the inks are the same, it means they have the same precise chemical composition; did I get that part right?
A. Yes, can I just -- well, I'll provide an example. I think that might clear this up. If you were to buy two chocolate chip cookies -- two different type of chocolate chip cookies, they'll have chocolate chips; flour, sugar, butter, right? So we can say that they're chocolate chip cookies based on all those. But now one recipe might call for two tablespoons of flour and the other one might call for three tablespoons of flour. So we can't feasibly look at the ratios of all of the different chemicals that were used so that's why we avoid using the term "same" because "same" means exactly the same in every aspect whatsoever. So that's why we use the term

they're "matching" formulations.
Q. So what is it about them that matches?
A. The dye components, the solvents. All of them based on the optical examinations using the VSC. They have the same infrared characteristics, they have the same ultraviolet characteristics. They're, obviously, the same color, they're the same type of ink. They have the same dye components based on the TLC examination.
Q. Okay. So with respect to the Ink 3 entry on document Q8, are you able to determine what volatile organic compounds are contained within that ink?
A. Based on my GC/MS analysis, they, obviously, had the 2-phenoxyethol or the 2-PE component.
Q. Are you able to tell whether there are any other VOCs contained in the Ink 3 on document Q8?
A. There -- so the GC/MS analysis that I ran was very specific for 2-PE. And then there are some -- potentially some other solvents that will show within that range of analysis. But

once again, I didn't find any differences between those two inks.
Q. Did you identify which solvents were present in Ink 3 on Q8?
A. No. I mean, my focus once I cannot differentiate them, which is, by the way, we have a standard for this, which is -- it's the Scientific Working Group for Forensic Document Examiners or SWGDOC, it's the standard for test methods for forensic writing ink comparison, which is included in my report.
So once we do a physical or visual microscopic optical and TLC examination, if the inks can't be differentiated at that point, the standard allows us to say that they match each other. But, obviously, to be clear, which is not to use the word "the same".
Q. Okay. Do you know which resins were contained in Ink 3 on Q8?
A. No, I didn't perform a resin analysis.
Q. Okay. Do you know which dyes or pigments are contained within Ink 3 on document Q8?
A. I can say that the same dyes in Ink 3 on

Q8 and Q12 were the same based on the TLC.
Q. Do you know which trace materials were present within Ink 3 on document Q8?
A. No, but once again when you add all of those components together, when you take the dyes, the solvents, the resins and the trace materials, if there are differences, generally, we would see that when we did the optical examination in the infrared, so there might be some different infrared characteristics if something is different in those formulations.
So that examination the Video Spectral Comparator or the VSC allows you to look at the ink as a whole.
Q. Okay. Did you say that with respect to document Q8 you combined your visual and microscopic examinations?
A. Well, on Q8 and, you know, Q12 I did -- I performed the VSC examination and could not differentiate the inks.
Q. I'm asking you something I think that's a different. You identified five different examinations, right.
A. Yes.

Q. Physical, visual, microscopic, optical and GC/MS, right?
A. Correct.
Q. So we've gone through so far your physical indentation exam, your visual exam with respect to document Q8.
Now I'm asking you paragraph 40 also contains your microscopic exam, right?
A. Yes.
Q. And paragraph 40 contains your optical exam?
A. Yes.
Q. And then your GC/MS exam and your TLC exam for document Q8, are those listed in paragraph 41 and 42?
A. So page -- paragraph 41 and 42, yes, covers both Q8 and Q12. And also too we should be clear that when we talk about the analysis of Q8, the Q8 ink, we're just referring to the black ballpoint Ink 3 and not the non-ballpoint ink that was used for the date on Q8.
Q. You've identified that as Ink 5, correct?
A. Correct.

Q. So with respect to Ink 3, can you identify what ink it is or is Ink 3 just a label that you select, you know, so that you can reference it in your report?

A. It's an arbitrary designation to be able to differentiate the inks that I've analyzed. I mean, I can tell you that the ink in all likelihood is an ink that's been around for several years that's manufactured by multiple manufacturers including BIC and Paper Mate but I didn't do a comparison to identify that ink formulation. But based on my experience with inks, it's a pretty common black ballpoint ink.

Q. When you say "in all likelihood," that's conjecture?

A. I wouldn't say it's conjecture. It's based on my knowledge, training and experience. But I'm letting you know that I'm not -- I can't confirm that because I didn't perform a direct comparison with a BIC or Paper Mate ink.

Q. Okay. From your answer, can I take that to mean that the document could have been written by a BIC writing implement?

MS. GUERON: Objection.

A. I wouldn't -- no, I would not characterize this with a single manufacturer. So like I said, there's multiple manufacturers that would that would have this type of ink. It's actually very simple from a formula perspective, it always just a few dyes that are mixed together. So I wouldn't call it a BIC ink, no.

Q. Have you completed your answer?

A. Yes.

Q. Let me clarify my question. My question was, is it possible that this Ink 3 black came from a BIC pen?

MS. PRIMAVERA: Objection.

A. Is it possible. But for reference throughout, I would just call it Ink 3 without a -- trying to identify it to a manufacturer. I can't do that.

Q. I'm not asking you to identify the manufacturer. I'm asking you whether it's within the possible solution sense that this could have come from a BIC writing implement?

A. It's possible.

Q. And could have also come from a Paper Mate writing implement, correct?

A. It's possible.

Q. And it could have come from any other number of brands, correct?

A. Yes, that would be correct. So other brands -- it's a very complicated -- it's a very complicated relationship with ink companies. Some of them will sell their ink to other companies or they'll use them in pens that you pick up in hotels and that sort of thing.

Q. Okay. Have you completed your responsibility?

A. Yes, sir.

Q. With respect to the Ink 3 black on document Q12, could that also have come from a BIC pen?

A. Yes.

Q. Could it have come from a Paper Mate?

A. Yes.

Q. You testified that you were unable to differentiate between the Ink 3 black on document Q8 and Ink 3 black on document Q12, correct?

A. Correct.

Q. Is it possible that they could have been written with two different brands of writing

implements?

MS. PRIMAVERA: Objection.

A. It's possible. I can't identify the brands that were used.

Q. To be clear, I'm not asking you to identify the brands that are used. I'm asking you about the potential solution space.

In other words, could document Q8 have been written in a BIC and document Q12 been written in a Paper Mate?

A. It's possible. But there's no evidence really to suggest that. It's more likely that they were written with a matching ink formulation, that's all I can say at that point.

Q. My understanding from your testimony, and please correct me if I'm wrong, you can have a matching formulation that's used in multiple brands, right?

A. It's possible, yes.

Q. You can tell me if it's chocolate chip cookies, you can't tell me if it's Chips Ahoy or an Oreo -- Oreo is a bad example, they don't make chocolate chips but you get my point?

A. Yes.

Q. So you use the term formulation, what does that term mean?
A. It's the overall recipe.
Q. Okay. So your GC/MS examination of document Q8 is contained in paragraphs 41 and 42, right?
A. That's correct.
Q. I'm sorry, just to ask you one more question about the formulation of ink. If you can tell that the recipes are the same, does that mean that they're chemically the same?
A. We don't use the word "the same." Once again, in order for something to be the same you would have to know all of the ratios, the exact amounts that were used. So the best I can say is that, you know, they generally have the same ingredients. I would -- so let me caveat that though -- if there are differences in certain ratios, there is the possibility that you would see those differences when you examine those inks under the VSC when you look at them in the infrared. So there's no evidence to indicate that there are some major differences. But once again, the standard does not allow us to say two

inks are the same.
Q. I want to ask you a little bit more about your chemical examination of document Q8. I'm looking at paragraph 34 of your report and in paragraph 34 you're describing the process of chemical examination, correct?
A. Yes.
Q. So that's a general description of how the examination works, right?
A. Correct.
Q. So in your discussion of the Thin Layer Chromatography, TLC, you state that in order to perform TLC on ink, the ink is extracted with a solvent from the sample plugs removed from the written entries; do you see where I'm reading?
A. Yes.
Q. Okay. So what solvent do you use to extract the ink from the sample plugs?
A. So for TLC I use Pyridine, P-Y-R-I-D-I-N-E. That's specifically for ballpoint ink.
Q. When you when document here refers to sample plugs, those are holes that you punch in the document, correct?

A. Yes, from the ink of course, from the writing.
Q. From the portion of the document that has writing on it, you extract a hole punched sample?
A. Yes.
Q. With respect to document Q8, did you follow this process?
A. Yes.
Q. So how many sample plugs did you remove from document Q8?
A. I don't remember exactly but can I -- I may have something in my notes. Can I refer to that?
Q. Yes, you may.
A. So I don't -- I don't have it noted here but I will tell you that it's typically three to five hole punches. Never more than five. And really never less than three unless I have a very limited sample.
Q. I'm not sure -- I'm not sure I caught all that because I was jotting down some notes. I think you said typically you would use three to five?

A. Three to five.
Q. Never more than five?
A. Never more than five -- well, I hate to use the word "never." I don't recall really ever using more than five from a ballpoint ink unless I really needed to. Sometimes there's other inks that are a difficult to extract, which I may have to do more than five but in this case that wasn't -- that didn't apply here. So I would say three to five.
Q. So with respect to document Q8, the ink was not difficult to extract?
A. Correct.
Q. So that means you would have taken five or fewer sample plugs?
A. Yes, I usually take five when I do onsite inspection, which I did in this particular case or I might take seven to have an extra but I won't analyze more than five.
Q. Why do you prefer to use five?
A. I don't necessary prefer to use five, it depends. I prefer to actually use three. Five sometimes the ink -- depending on the ink and how think it is on the paper can be too -- it can be

too concentrated.
Q. Why does that matter?
A. Because when I -- when I perform the TLC examination then the -- as you can see in figure three that I have in my report sometimes those spots will get too heavy and then it will be hard to hard to compare the spots at each of the different levels. It all starts to run together.
Q. So just for my understanding, the TLC examination that you're describing in your report involves a process that allows the ingredients of the ink to separate so that you can look at them, is that more or less correct?
A. The colorants.
Q. Colorants. This examination only concerns the colorants portion of the ink?
A. Yes. But in some cases when I -- because I'll visualize the TLC on the VSC and when you visualize it in the infrared sometimes you will see other components that are not necessarily the dyes.
Q. What did you do with respect to document Q8 here?
A. Can you be more clear. What did I do?

What do you mean what did I do?
Q. Well, I think you just testified that sometimes you visualize and you can see other components beyond the color, did I get that right?
A. Not sometimes. I would say that almost all the time I'm doing that. Rarely do I not do that.
Q. Okay. So what did you do here with Q8?
A. Just like I said, which was I performed the TLC examination, I took photographs of it and then I examined it with the VSC.
Q. Okay. Were there colorants you were able to discern for Q8?
A. Yes.
Q. Did you do the same analysis for Q12?
A. Yes.
Q. Did they match?
A. Yes, they were all done on the same -- sort of the same TLC plate like you see on figure three.
Q. So in discussion of your inability to differentiate the ink, you're incorporating in that result your observations from the TLC

examination, is that right?
A. Yes, it's everything combined.
Q. You can't tell me how many sample plugs you took from document Q8, can you?
A. I said three to five. I can't give you the precise number on whether it was three or four or five but it was three to five.
Q. When you -- what's the next step -- after you take the sample plug, what's the next step in the process of conducting your TLC analysis?
A. So once I take the samples -- in this particular case, I extracted the samples in New York and then I had to bring them back with me. But once I brought them back to the laboratory, I then transfer them into a glass vial and then I add a solvent.
Q. Did you complete your response?
A. Yes, I'll sop stop there.
Q. Okay. So when you take the three to five sample plugs, do they go into the same vial?
A. I'm going to check my notes. I may have -- yes, so the samples that I remove -- yes, they all go in the same vial. Yes.

Q. Okay. So when you conduct your TLC examination, is it one examination of the three -- of the vial of combined sample plugs?
A. Yes.
Q. So what's the purpose of taking more than one sample plug?
A. Because it might not be concentrated enough. I need to be able to see those components, like in figure three. If I only take one plug I may not be able to see all of those components. The idea is I want to get the right concentration, if you will, where it's not too concentrated and not under concentrated.
Q. What determines the amount of concentrate in a sample?
A. It depends on how thick the ink is on the paper. It can also depend on the ink formulation specifically. Some inks will not extract in a concentrated way or they'll overly -- they'll be overly concentrated.
Q. Is there some scientific standard that you reference which tells you how many samples to take?
MS. PRIMAVERA: Objection.

A. Well, as I already said, there's the SWGDOC standard for writing ink comparisons but that standard doesn't specify exactly the number for the reasons that I just mentioned. Sometimes you don't know until you start extracting and then -- but that -- but you can adjust that by how much sample you take for the spot you're going to put on the TLC plate. So if it comes out really dark then I have to -- typically I'll draw, you know, two microliters into a pipette and then I can adjust that depending on how concentrated the ink looks once it's in this solution. So sometimes I'll just draw one microliter, sometimes 1.5 or sometimes it will be two.

Q. Have you completed your response?

A. Yes, sir.

Q. Is that process you just described part of the standard for test methods for forensic writing ink comparison that you referenced on page 14 of your report?

A. I would actually say that goes back to basic chemistry -- college chemistry when you do TLC analysis.

Q. So is TLC analysis part of an undergraduate or graduate chemistry curriculum?

A. Yes, absolutely.

Q. Is the use of Pyridine part of any generally accepted scientific standard?

A. Pyridine is mentioned I believe in the SWGDOC standard.

Q. Is SWGDOC separate from the standard for test methods for forensic writing ink comparison?

A. SWGDOC stands for the Scientific Working Group for Forensic Document Examiners, that's the group published the standard.

Q. When you say "the standard," are you referring to the standard for test methods for forensic writing ink comparison?

A. Yes.

Q. So SWGDOC is the organization and standard for test methods for forensic writing inc comparison is a standard promulgated by that group?

A. Well, you're going into a rabbit hole. So I will say that the SWGDOC -- originally SWGDOC was a group that was funded under the department of just and the FBI. I was part of

that group, I was the technical representative for the ink standards. But we then published the standards through ASTM and we did that for many year. And then ASTM turned over the rights to those standards back to SWGDOC, which are published on the website. So they are SWGDOC endorsed standards but have been published through ASTM. ASTM is a Standards Development Organization or an SDO.

Q. Is ASTM an acronym?

A. Yes, it's the -- ASTM international, is the Association For Standards, Testing and Materials. But the ASTM actually just become ASTM.

Q. So the name of the entity has changed?

A. Well, it's just ASTM now. Historically, yes, it was it was an acronym. It's almost used as a term now, ASTM, or the name of the organization.

Q. Are all of the examinations that you performed pursuant to the SWGDOC, slash, ASTM standards?

A. Well, as I highlighted in my report. Certainly for the -- you know, for the ink

comparisons, for the indentations, we do have SWGDOC standards for those, yes.

Q. Do those standards also govern your GC/MS testing?

A. It does not. There is not a standard that was published through ASTM for the GC/MS analysis.

Q. Is there a standard published through any other entity for the GC/MS analysis?

A. There are multiple standards for GC/MS analysis but not for inks.

Q. Is the GC/MS analysis used for analysis of things other than inks?

A. Yes.

Q. Can you give me any examples?

A. Explosives, drugs, miscellaneous materials, unknown materials, pharmaceuticals.

Q. Okay.

A. Probably I would say it's the most utilized instrumental analytical procedure in the world for chemical analysis.

Q. So did I correctly understand your answer that SWGDOC and ASTM do not have a promulgated standard for the use of GC/MS testing

for inks?
A. Correct.
Q. Okay.
A. There's multiple publications but not a standard for this.
Q. There's multiple what?
A. Publications -- peer reviewed publications.
Q. Is there any other -- well, you described an SDO, Standards Development Organization, is that what it stands for?
A. Yes.
Q. Is there any other SDO that promulgates the standards for the use of GC/MS testing of inks?
A. No.
Q. Is SWGDOC also considered an SDO?
A. No.
Q. What's the difference between those two entity types?
A. So an SDO is an organization that promulgates standards through a process -- through a regulatory process, if you will. And SWGDOC was the group where we drafted the

standards and then we submitted them to the SDO. So SWGDOC is really a composition of expert.
Q. So if we use like a unit of measurement, like a meter, right, there's some entity that defines what a meter is, right?
A. Correct.
Q. And is that basically the same thing that ASTM is doing?
MS. PRIMAVERA: Objection.
A. You're asking questions that sort of require an immense amount of background that's not that simple to answer. But the meter -- what happened is that there would probably -- there's scientific research and ways to identify exactly what a meter is and that goes through all kinds -- all types of processes and then at some point in time you would use an SDO to put forth all of that information and write a standard of what a meter is and then the SDO goes through a long process of open public comments and then and then people vote on that standard and if it's -- if it passes a certain majority then it becomes a standard. But an SDO does not necessarily write its own standards, if that makes sense.

Q. Okay. So I'm understanding from your answer that the SDO is the organization that decides upon the standard but it can decide to use the standard offered through some third-party; is that correct?
A. No, the SDO -- the SDO's purpose isn't to decide whether to use the standard. They -- based on a voting process, they decide whether the standard should be published. Once it's published, you -- they're not mandatory -- in most industries it's not mandatory that you have to use the standard.
Q. So the SDO publishes a standard but it doesn't necessarily publish a standard that it created. It could be publishing a standard created by some third-party, did I get that right?
A. Correct.
Q. Using the same framework, SWGDOC drafted the standard, provided it to ASTM and ASTM through the process you described elected to publish it, is that right?
A. Correct.
Q. Is there any such framework applicable

to the GC/MS examination of ink?
A. No, not for -- not through an SDO. There are standards for ink analysis that are in the published literature but not that have gone through an SDO.
Q. So when you say there are standards, you're referring to a body of peer reviewed work that have been published in the various publication, is that right?
A. Correct.
Q. All right. So with respect to the GC/MS analysis that you're describing in paragraph 35 and 36 and 37 and 38, you're looking at the rate of evaporation of 2-PE, correct?
A. That's over -- that's over simplified but yes.
Q. Are there any other examinations that were performed using GC/MS of the document Q8 other than with respect to the 2-PE content?
A. There are certainly quality control samples that I analyzed using the GC/MS.
Q. Okay. So with respect to your TLC examination, you described the process of taking sample plugs, putting them in vials, developing

them on a plate with a mixture of solvents and then applying the SWGDOC standards.

Now with respect to the GC/MS, how can we how can we identify the process that you used to conduct the examination?

A. I'm not sure what you mean by "identify the process"?

Q. Well, does your report describe the process that you used to conduct your GC/MS analysis?

A. Yes.

Q. So where can I find that in the report?

A. That should be throughout -- I mean, section D.

Q. Section D you said?

A. Yes. Paragraphs 35, 36, 37, and 38.

Q. So those are the paragraphs I just referenced?

A. Yes.

Q. So starting with paragraph 36, you're describing what the examination is looking at, right?

A. (No verbal response.)

Q. Let me try it a different way. Your

paragraphs 36, 37 -- sorry, 35, 36, 37 and 38 are generally describing what a GC/MS examination is and does, correct?

A. No, because there is a discussion about how the solvent evaporates from the paper -- from the ink when it's applied to the paper. I talk about the method that's used where you take plugs at 70 degrees Celsius, you measure the difference between the unheated and heated samples so there's a methodology that's described in there.

Q. So how can I tell from reviewing your report what you did with document Q8 with respect to the GC/MS analysis?

A. Everything that's in those paragraphs is what I did to Q8.

Q. Well, for example, right, in order to conduct your GC/MS examination do you take samples of the document?

A. Yes.

Q. Is that described in here?

A. That's described in -- I believe, in paragraph 33. So just to read the last sentence of paragraph 33, "In order to conduct both TLC and GC/MS, I removed paper and ink plugs from

representative areas of the written entries with a specialized hypodermic like device."

Q. Okay. Have you completed your response?

A. Yes.

Q. Okay. So did you use -- did you remove paper and ink plugs from document Q8 to conduct the GC/MS examination?

A. Yes.

Q. Does your report describe you doing that?

A. The reasons and bases section talks about how that's done and then later on I say in my observations and results from testing section that I performed a GC/MS analysis, which applies to the GC/MS analysis that I described previously.

Q. Does your report tell me how many plugs you the took from document Q8 to perform your GC/MS analysis?

A. No, that's all in my notes.

Q. Does your report tell me whether your plugs were half a millimeter or one millimeter or something in between?

A. They were 0.5 millimeters, that's in my

notes.

Q. But that's not in your report, right?

A. That's in my notes.

Q. Does your report tell me how many plugs you took for the GC/MS analysis?

A. It's in my notes, it's not in my report.

Q. How many plugs did you take from document Q8 to perform your GC/MS analysis?

A. Four.

Q. Why did you use the number four?

A. I typically use three to five but it's -- but I also performed duplicate testing. So in order to minimize the amount of samples that I take, sometimes depending on how much write is present, then I'll change that from three to five. But at the end of the day it doesn't really matter because as I described in my report, I'm going to look at the relative difference between the samples that have been unheated or not treated and then the samples that have been heated. So the important part is just I use the same amount of samples for both.

Q. Well, what I'm trying to find out is if I wanted to replicate your process from your

report whether I can do that.
So you mentioned that you use typically three to five plugs; is that correct?
A. Correct.
Q. What determines whether you use three, four or five or some other number?
A. It depends on the amount of ink that's present. If I'm going -- you know, how many times -- I have to duplicate the testing so it's four times two, which would be eight and then I have to use that for the unheated and then I need eight more for the heated so that's sixteen hole punches that I'm taking.
Q. Can you walk me through that process that you just described and explain to me, for example, what's the difference between your testing and your duplicate testing?
A. I'm doing the testing twice.
Q. Okay. So just walk me through step by step what you do with taking plugs and using the plugs, can you do that, please?
A. Yes.
Q. Okay.
A. So I remove the 0.5 millimeter hole

punches for GC/MS testing. In this particular case I removed four or really it's eight that I'm taking but I divide those up between -- and put those into two vials. So I take four hole punches and place that into a vial. I take another four hole punches that are in the very near vicinity of where I took the first four hole punches and I put that in a second vial. One of those vials then I just -- I perform the testing for the 2-PE, the GC/MS analysis, I get a value for the quantity of 2-PE and then the other vial I heat those hole punches at 70 degree Celsius for 90 minutes and then I measure the amount of 2-phenoxyethanol in the heated samples. And the idea based on lots of research -- years of research is that if the ink is fresh then you will drive off a lot of phenoxyethanol when you heat it. If it's not fresh, if it's old, then you're not going to drive off very much phenoxyethanol because it will be completely dry. The term that I use "a lot" is 25 percent, which is the threshold that we use to say with a high degree of probability that an ink is less than two years old when those values exceed

25 percent.
Q. Have you completed your response?
A. Yes.
Q. So with respect to the number of plugs you took for your GC/MS analysis of document Q8, did you take eight plugs or did you take four plugs?
A. I did -- I actually did sixteen. So I did four unheated, four heated and then I repeated that again and did four unheated, four heated.
Q. Let me just see if I'm keeping up with the steps.
Step one you took sixteen plugs from document Q8, did I get that right?
A. Correct.
Q. Then you took four of those plugs and you put them in a vial; is that correct?
A. Correct.
Q. And you took four other plugs and put them in a second vial?
A. Correct.
Q. You heated the first vial at 70 degrees for 90 minutes; is that correct?

A. Correct.
Q. You did not heat the second vial?
A. Correct.
Q. Do you somehow measure vial number one after it's been heated?
A. I do a relative measurement of the -- when I compare the heated and the unheated and in order to do that I use something called an internal standard.
Q. You're going to compare two different vials; a heated and unheated, correct?
A. Yes.
Q. Do you have to take measurements of each of those two vials?
A. Not when I'm doing a relative comparison. If I have two people standing next to each other and one is 6'1 and the other is 5'8 and you can ask me who is taller, I can take a ruler and measure a difference in their height. I don't have to measure one and say, oh, he's 5'8 and measure the other and say he's 6'1. I can just say there's a -- you know, a five inch difference.
Q. Okay. Let's stick with your analogy

that you just used. In your analogy you used a ruler as your measuring tool, right?

A. Correct.

Q. In taking your relative measurement of the two vials, do you have a measurement tool?

A. It's called the internal standard.

Q. What is the internal standard that you just referenced?

A. The internal standard is another chemical that's put in with the extraction solvent and it's called o-cresol. I put the cresol in the extraction solvent or in a mixture, if you will, and I use that to extract the ink from both the samples.

And then there's -- then I do -- then there's calculations where the cresol -- you get more of -- I guess the best way to put it is a corrected value because the cresol acts as a measurement tool and a ruler in both of those sets of samples. So that allows you more precision when you're doing the relative comparison.

Q. Okay. I want to see if I understand this conceptionally. Let -- I'll paraphrase back

to you and let me know if I got it right or if I'm off with something, okay.

You got the two vials; first vial is heated the second vial is unheated; is that correct?

A. Correct.

Q. And then do you add this o-cresol to each of those two vials?

A. I add o-cresol and acetonitrile. O-cresol is the internal standard, acetonitrile is the solvent. So it's a combination of acetonitrile and o-cresol. The acetonitrile acts as the primary extractor, the one that pulls the ink from the paper and puts the 2-PE into a liquid solution.

Q. Did I get the term right, acetonitrile?

A. Correct.

Q. And o-cresol?

A. Yes.

Q. So do I understand correctly that with respect to the heated vial, you're adding acetonitrile and o-cresol into that vial?

A. Correct, for five minutes.

Q. With respect to the unheated vial, do you add acetonitrile and o-cresol?

A. I use the exact same solution so that the ratio of acetonitrile an o-cresol is the same in both, yes.

Q. So then after you've added the acetonitrile and o-cresol to vial number one and the five minutes elapsed, what do you do with the vial?

A. Now I then remove the liquid ink, I remove 10 microliters from that vial and I put that into another vial.

Q. So --

A. And that's the vial that would be used for the GC/MS analysis.

Q. Let's keep breaking it up into, pieces. Vial number one you add those two components to it for five minutes, you wait. Then you remove 10 microliters of the substance that's in the heated vial, correct?

A. Correct.

Q. It's mixed together or is it separated somehow within the liquid?

A. Yes, so I think this is the issue we run into when -- I'm not complaining here but you're asking questions so out of order. But if -- if I

was explaining this to somebody from the beginning I would use an analogy of think about it if you got ink on your shirt and you tried water and you tried to brush it off, it smudges or nail polish remover. Really what extraction is it turns the ink -- the hard ink into a liquid. That's the whole idea of an extraction.

So, yes, when I put the acetonitrile and the o-cresol together that is my -- the acetonitrile is my extraction solvent. The o-cresol is the measurement tool or if you will the ruler that's going to be used in there -- that we're going to correct for when everything is done.

So, yes, ten microliters of the acetonitrile plus the o-cresol is removed so that I'm not taking the paper plugs because when I -- if I let the plugs sit in the solution, right, then they're going to continue -- they can potentially continue to extract. So I remove just the liquid out and put that into another vial and then that goes into the GC/MS.

Q. Have you completed your response?

A. Yes.

Q. Okay. So let's rewind it a little bit. You got vial number one with the four plugs in it. You add the acetonitrile and the o-cresol, you let it rest for five minutes; is that correct?

A. I agitate it for five minutes too so it's not just rest. I stir it up.

Q. Okay. It's agitated for five minutes, do you have some kind of machine that shakes it or something?

A. I don't agitate it for the whole five minutes, I tap it probably -- I don't know, 30 seconds at least just to mix it up. And then, yes, sometimes I -- what I do have is a vortex -- it's called a vortex and I put it on the vortex and that actually shakes it. I do that for -- I don't know, ten seconds or so and then I let it sit. I continue to shake it up and then when I remove the ink that's been extracted, I put it in a syringe but I also mix it up with the syringe too.

Q. Let's rewind that again. So you got the vial with the four plugs in it, you add the acetonitrile, you add the o-cresol. Some period

of time elapses and then it gets agitated, is that right?

A. It's being agitated in the interim, yes, for over that course of five minutes.

Q. Well, is it being continuously agitated for the entire five minutes?

A. Like I said, I'll tap it, I'll shake it, I'll vortex it but then I'll also -- once the five minutes starts -- I think -- I would say typically when I'm about four minutes and 45 seconds then I'll start agitating it with the syringe, sucking it up, pushing it out, just to make sure it's all mixed completely.

Q. Are you describing to me a process that you're engaging in manually?

A. That part is manual, yes. It's called extraction. That's a manual process, yes.

Q. But the vortex piece of it, is that also manual?

A. It's a sample prep. It's a little -- it's a little instrument that I have that shakes -- it shakes when you push down on it so I put the vial on there and it shakes it.

Q. Is it being continuously shaken by the

vortex?

A. No, that's about ten seconds. I'm just agitating it -- just trying to mix it up. I don't have to -- it's not necessary to shake it for five minutes.

Q. So when you put it on the vortex and you depress the vortex, it shakes it for ten seconds?

A. Approximately, yes.

Q. How many times do you do that?

A. Once.

Q. So you do that for the heated sample. You do the same process for the unheated sample, correct?

A. Correct.

Q. So at the conclusion of this process of five minutes with the agitation at intermittent periods manually and through the vortex, what do you end up with after the five minutes?

A. Then I end up with a liquid solution of ink, acetonitrile and o-cresol.

Q. And is that solution uniform or does it separate according to density in the vial?

A. No, it's uniform. That's the purpose of using acetonitrile.

Q. So it's a uniform solution?

A. Yes.

Q. You extract 10 microliters of that uniform solution?

A. Correct.

Q. And you place that in a new vial?

A. Yes.

Q. What do you do with the new vial?

A. The new vial goes on to what's called the GC portion of the GC/MS and it has what's called an auto sampler. And the auto sampler has a hypodermic needle in it that punches through the vial and then draws one microliter of that liquid solution and then it injects it into the GC, which travels through that and then over to the MS.

Q. Okay. So let me see if I understand what happens with the new vial.

The new vial starts to ten microliters of the uniform solution of the ink, the acetonitrile and the o-cresol, is that correct?

A. Acetonitrile.

Q. Acetonitrile. Sorry. So that's where we start out with, right?

A. Correct.
Q. And then you use a device called an auto sampler to punch through the vial and to pull out one of those ten microliters?
A. That's close. But, yes, the auto sampler has a hypodermic needle that's built into a robotic arm and that hypodermic needle injects into the new vial. The vial is very specialized, it has a top on it, almost like a rubberized center so that the needle can go through it. And that needle goes through the vial, pics up one microliter and then the one microliter is injected into the GC/MS, and that's all robotic.
Q. So you start with ten microliters and the robotic device extracts one of those ten microliters and puts it into the GC device?
A. Once again, we're kind of going into a rabbit hole. So the way that I have my GC/MS programmed is that it -- what it will do is it will make the hypodermic needle go in there and it will drop one microliter and then it will dump one microliter into a waste vial and that does that twice. And it's more of sort of a cleaning process to make sure everything is picked up

correctly and then on the third time it draws another microliter and it injects directly into the GC/MS.
Q. Let's back this up again. You start with a new vial with ten microliters of the uniform solution of acetonitrile, o-cresol and ink, right?
A. Correct.
Q. Then your auto sampler uses its robotic arm to extract one of those ten microliters; is that correct?
A. Correct.
Q. And then one drop of the one microliters is placed into some other receptacle?
A. The one microliter sample that the plunger -- once the hypodermic needle plunges in, pulls up one microliter, it then moves over robotically to a waste vial and dumps that. And then it goes to another vial where it cleans again with an acetonitrile solution that's in the robotic arm and then it goes back into the vial, does one microliter again, goes back to the waste and then goes through the cleaning process and then comes to what we call the ana-link sample,

the sample that's going to be analyzed, then takes that one microliter and it injects it in the GC/MS. This is all preprogrammed and this all based on the scientific literature and it goes back to sort of a lot of basics about GC/MS. I've been a GC/MS chemist for -- I've been using GC/MS since 1993, a long time. I was drug chemist for many years and used GC/MS thousands of times. This is kind of a standardized method that's used by GC/MS.
Q. Have you complete your response?
A. Yes.
Q. So let me rewind and see if I'm following you. Your ten microliters gets extracted by the auto samplers robotic arm, it extracts one microliter. It's programmed to process that one microliter by adding more acetonitrile to it and placing it into the first of multiple empty clean vials, is that right?
A. There's two -- no, so there's one dirty vial, one waste vial and two cleans that have -- and the two cleans have clean acetonitrile in them.
Q. So when the uniform solution is

traveling through the GC robotic components, it's placed first into a waste vial?
A. There's a trey -- it's an auto sampler trey -- it's a robotic trey, it all moves automatically. On one end of the trey is a waste vial and then there's two clean vials. When I say "clean vials," those vials contain a clean acetonitrile, just acetonitrile. So what will happen is now when I put the vial that's going to be analyzed, it goes -- into goes into the trey, the trey moves over under the robotic arm, the syringe dips into that, takes one microliter, then the arm moves back over and disburses the one microliter into the dirty vial or the waste vial.
Now, that -- the robotic arm goes to the clean vial with the acetonitrile, it pumps and then it then it dumps the clean acetonitrile back into the waste vial, then goes back over to the vial again and does that twice. And then on the third time it goes back to the vial, takes the one microliter and then that's the one microliter that gets into the injected into the GC/MS.
Q. Let me rewind this and see if I'm

following. You have the heated vial, you add the acetonitrile and o-cresol to the heated vial, it agitates, goes through the five minute period you described. After that concluded, the auto sampler will withdraw ten microliters of the uniform solution, it will --

A. No, no. I have to stop you there.

Q. Sure.

A. The auto sampler doesn't withdraw ten microliters, it's programmed to withdraw one microliter. So the manual -- the -- as we call it, the sample prep -- the sample extraction procedure, I use a hypodermic needle that's accurate to .005 microliters. So I withdraw ten microliters and then I put that in the vial that's then going to go on to the GC/MS.

Q. That vial gets put onto the trey underneath the GC/MS machine, is that right?

A. Over top the GC/MS, not under.

Q. So it goes on the top and underneath are multiple vials; one waste vial and two clean vials?

A. Correct.

Q. So the one microliter that's on the top

of the GC/MS is going to go through the GC/MS machine, is that right?

A. Well, yes, one microliter from the analysis vial -- call it that -- because that's the vial that contains the liquid ink that's going to be analyzed. One microliter is going into the machine.

Q. Okay. I'm trying to keep track of the microliters. You're starting with ten in a vial?

A. Correct.

Q. Only one of those ten microliters goes onto the top of the GC/MS machine; is that correct?

A. Correct.

Q. Okay. So that one microliter that's on the top of the GC/MS machine is going to go through three different processes through the GC/MS machine; is that correct?

A. No, no, no. So the ten microliters goes through three different processes.

Q. Okay.

A. One is removed, then cleaned, it goes back; another is removed -- call it -- we're at microliter two now, it's cleaned, then it goes

back; and then now it pulls up the third of the ten microliters and then injects that into the GC/MS.

Q. What's the purpose of taking microliter number one and running it through the GC/MS?

A. It's to make sure that the hypodermic needles doesn't have any air bubbles in it. If you ever go for a shot and you see the doctor flicking it, the idea is so you don't have any air so you can get a more precise measurement. Also too the reason it's doing that is because once it pulls up it, it needs to rinse that to make sure all of that ink material -- that ink liquid that was removed, that's it's clean. The needle every time wants to make sure it's clean before it goes into the ana-like vial. That cleaning process is actually pretty extensive too because that happens a few times. It's all automated once you get -- the whole idea is to make sure that that arm -- because the arm is pulling up the syringe and it wants to make sure it's not -- it doesn't have any air in it.

Q. So microliter number one is for the purpose of cleaning the hypodermic and making

sure there are no air bubbles in it?

A. Correct.

Q. Microliter number two, is that for the same purpose?

A. Correct, same thing.

Q. Microliter three goes into the GC/MS and that's the microliter that's analyzed?

A. Correct.

Q. So you do this for the heated sample -- for the heated vial and you do it for the unheated vial, right?

A. Correct.

Q. Does the GC/MS give you some kind of digital read out?

A. Yes.

Q. What format is the read out provided in?

A. So the read out contains varying information. The first is that as we described earlier, GC/MS is really two different instruments. So the GC gives you a read out that look -- basically like a graph and then that identifies -- will show you where the 2-PE is on that graph. And that's based on -- we haven't gotten into this but I've run lots of quality

control standards before. So I run blank samples, I have to run a positive standard. I run the acetonitrile cresol solution -- I run that as a blank it also so there's nothing in it. And then I have the standard so I know exactly where the 2-PE is going to come out on this graph. If you think about the Y axis of this graph, it's in minutes -- it's in time. And so I know that, you know, my sample will come out at 5.30 minutes for 2-PE, that's the GC output. The mass spec or MS portion allows me to identify the molecule of 2-PE. So that provides what we call molecular information about that particular molecule so that I can confirm that I'm analyzing 2-PE.

Q. Have you completed your response?

A. Yes.

Q. So the machine is going to give you two forms of output; one is the graph and two is molecule identifying information?

A. Yes.

Q. So going back to this process that you described --

A. I'm sorry, can I just sort of -- just to

be clear so we understand what the GC is. The GC is all about separating the different components in the ink. I typically use this analogy of, you know, if you were to analyze a Coke, you get sugar and caffeine and colorants and all that. So those come out at different times on the GC. That's exactly what happening on the GC with ink because you get different times of when the different components come out. And I know the time for 2-PE based on the standard. On my GC/MS -- my program is 5.30 minutes or around that time.

Q. Have you completed your response?

A. Yes.

Q. This process that you described of using the auto sampling, the agitation, that process is not described anywhere in your report, is it?

A. No, it's -- all of that in is my notes.

Q. So I can't replicate this process using your report, can I?

MS. PRIMAVERA: Objection.

MS. GUERON: Objection.

A. I mean, I've been -- I've written thousands of reports in Federal Court. But if

I'm an expert looking at another expert's report there's no expectation that I can duplicate everything based on just the report.

Q. Okay. I didn't ask you that. I asked you if I can replicate your results based upon the contents of your report?

A. Well, in theory, yes, you -- so I have a reference in my report to a chapter that I published that actually goes through the steps like. It's published -- a published chapter that goes through this. But I mean it's kind of -- the question you're asking me would be like, well, if I watch Law and Order can I practice law? I mean, you have to be an expert in the area, you have to have basic chemistry knowledge. When you refer to can you do this, unless you have a chemistry background, I can't imagine you can ever do this.

Q. If I was a chemist, can I replicate your process using your report?

A. You should be able to because there's references to it. I would say my notes would provide that information that a chemist can replicate this very easily.

MS. COLWIN: Objection.

Q. So a chemist would need your notes to replicate your work; is that correct?

A. Yes, I know when I've been an opposing expert I always want the notes. I can't just simply rely on the report.

Q. Is your use of o-cresol documented in any of the professional standards you referenced?

A. It's definitely -- I mean, I have my -- I have a written and standard operating procedure and it's in there. But, yes, o-cresol is definitely mentioned in a number of professional or peer review publications.

Q. Is it mentioned in any of the publications cited in your report?

A. I'm not sure exactly what's been cited but it's definitely in the peer review publications.

Q. Is there anywhere in your report where I can find the read out from the GC's graph?

A. No, that's -- that's in my -- that will definitely in be in any notes.

Q. Is there anywhere in your report where I can identify the output of the identified

molecule from the MS portion of the analysis?
A. No.
Q. What was the read out that you obtained for the first heated sample that you --
MR. BERMAN: Let's back up. I'll ask the question again because it cut out.
Q. My understanding is that, based on your testimony, you get two sets of output from the GC/MS machine; is that correct?
A. It's -- so it is a printout or a read out, if you will, that has both of those types of information.
Q. Did you record the output from the GC/MS machine that you obtained when you ran the first heated sample from Q8?
A. All of my data is automatically printed out and it's in my file, yes.
Q. You also -- so you have the output from the GC/MS from the heated sample of Q8 and the nonheated sample of Q8?
A. Yes.
Q. And you ran that twice, correct?
A. I'm actually looking just to confirm but, yes, I ran -- tested those -- which document

are we taking about now?
Q. Q8 -- still Q8.
A. I'm sorry, Q8, what was last three of the Bates.
Q. 827 and 828 -- hold on. Q8 was Bates-stamped 830, slash, 831.
A. Okay. I'm sorry, I have -- because all of my -- I use the last three of the Bates in all my GC/MS. I didn't use the Q numbers.
I did the test on -- twice. I did it on page 1 or 8 -- Bates-stamped -- last three of the Bates-stamp, 830. And then I did it on the backside, Bates-stamped 831.
Q. So you only did one heated sample and one unheated sample of page one of Q8, is that right?
A. Well, it's one page so I would say the front and the back. So, yeah, one heated, one unheated for the front and one unheated and one heated for the back. I mean, that's two for the page, if you will.
Q. Okay. Now, I'm a little confused by something you said. If it's literally the same page, 830 and 831 are written on the same piece

of paper, front and back, correct?
A. Correct.
Q. So isn't the sample of page one necessarily also a sample of page two because they're on the same paper?
MS. PRIMAVERA: Objection.
A. They're different samples. I mean, certainly when I punch the holes I'm not -- I make sure there's nothing -- there's no ink on the backside of where I'm punching.
Q. Okay. So that's part of your process is to see which face of the document has ink and which face does not have ink in each of the plugs?
A. I'm making sure that when I punch the hole that I'm not hitting ink on the opposite side.
Q. Okay. Is that process described somewhere in your report?
A. No, it's almost like common sense. I'm not going to take samples, you know, where I get ink -- where I would get ink on -- where I would punch through and get ink from the other side.
Q. In selecting your samples are there any

other procedural safeguards that you employ?
A. Oh, yes, lots.
Q. Okay. Can you give me some examples?
A. The first thing is that I make sure when I'm taking samples -- well, I would say the first step is to make sure I don't want to -- I'm not going to hit a sample of ink on the other side for my GC/MS testing.
The next is I then look at it under -- I look at the ink or the letters words with a magnifying device. And then I find specific areas that are amenable to what I would say the ink analysis part. And that is generally don't like to get into the curve areas. Ballpoint inks will also do what's called gooping so I stay away from the goop. I try to get straight lines and then when I find a nice area that looks consistent with pressure, typically like the middle of the stroke -- like if you're drawing a line -- and I'm just thinking of the letter "G" if I go up with the letter "G" in all likelihood I'll put more pressure down on the bottom or the top. So I find this ideal kind of the area in the middle. And based on the microscopic

analysis I make sure that the ink is not -- it's more thick in one area than the other. And then I take a hole punch that will go into the unheated vial and then I take a hole punch adjacent to that area and then that will go into the heated vial so that I'm keeping is as consistent as possible with the amount of ink I'm removing.

Q. Have you completed your response?

A. Yes.

Q. So the gooping should be avoided because, what, it could affect the amount of 2-PE that's present on the document?

A. The idea is that I want to try to as much as possible to have similar amounts of ink in the unheated and the unheated when I do the testing. Now, I'll correct for now with o-cresol but for the most part I want to just make sure I'm getting the same amount of ink.

Yeah, if I took from a goop area then I might have more ink and also the goop might dry differently because it's thick and it's heavy on the paper.

Q. Similarly with respect to a curved

versus a straight line portion of the sample, that could result in different amounts of ink being removed, is that right?

A. Yeah, depending on where it is in the curve. Like, you know, it depends on the writing. Some people may have a big curve. If you're kind of getting into sort of the middle of that, that can work. But, once again, it's all about sort of identifying whether there is sort of differences in the amount of pressure that was applied, which you can see under the microscope by the amount of ink that's deposited down.

Q. The amount of ink deposited can vary based upon whether there's gooping of ink, whether there's curvature of the pen stroke and whether there is a different -- or a lighter or heavier pressure applied to the pen stroke; is that right?

A. Correct. And then also at sort of the tail or starting point of writing -- if you write with a ballpoint ink sometimes it's doesn't -- not all of the ink is flowing out equally in the beginning or when you're tailing off you lift the pen so that you're not leaving as much ink in

there. I kind of stay away from the ends. I like the centers. Straight is nice -- is ideal but it's not always that easy.

MR. BERMAN: Let's take a five-minute break. It's been a while so let's do that. Come back at 12:15.

(Whereupon, a brief recess was taken.)

MR. BERMAN: I propose we make this into a lunch. We will come back at 1:00.

(Whereupon, a luncheon was taken.)

Q. Mr. LaPorte, before our break you had mentioned that you ran some quality control tests, do you recall that?

A. Yes.

Q. Can I find information about what quality control tests you ran in your report?

A. That's all in my notes.

Q. We were also talking about the output of the GC/MS system and you had mentioned that the GC portion results in graphical output, do you recall that?

A. Yes.

Q. You explained to me that the output of the graph shows time on a Y axis, is that right?

A. Correct -- I'm sorry, did I say "Y"? It's an "X." Sorry.

Q. So X axis is left to right, correct?

A. Correct, yes, the horizontal axis.

Q. So when you're getting a measurement in time, what does that mean?

A. When a chemical or when a material goes through the gas chromatograph, what happens is it separates into it's different components and so when it exits the gas chromatograph and enters the mass spectrometer, that happens at a certain time and based on the chemical makeup of all the different molecules that be would be in particular in the ink so all the different components that come out -- they come out at different times because they're --

Q. Okay.

A. Yeah, so 2-PE comes out at, you know, at a retention time of approximately 5.30 minutes on the program that I use. Now, I do run a standard of 2-PE beforehand so that I know that, you know, that that's the retention time it should come out at.

Q. When you say you run a standard, does

that mean -- I'm paraphrasing -- you do a test run of a sample of PE that you've known already?

A. Yes.

Q. So you're on that simple through your system and you look and you see it comes out about 5.3 minutes?

A. Correct.

Q. So these molecules are contained in the GC system and then each kind of molecule will be separated out at a specific point in time?

A. Yes.

Q. So the graphical read out that you get will identify molecule one separates out at this time, molecule two separates at that time?

A. Correct.

Q. And the MS portion is identifying the molecule as it comes out?

A. Yes.

Q. So how do you compare the read out on the GC/MS for the heated sample against the unheated sample?

A. So there's a software in the instrument -- hold on, let me step back -- so the Y axis is an approximation, if you will, or the

concentration of the 2-PE. So think of a curve, right, that comes out at 5.30 minutes and it does that -- I guess I shouldn't be saying doing that on the record -- so it makes a curve and then what will happen -- so depending on the height of that curve, that's typically -- I mean, that represents the concentration. So really the area under the curve represents the entire concentration of 2-PE. So there's a read out that -- or some data that's printed out that has that what that corresponding area under the curve represents in terms of a quantity.

Q. So there's a mathematical computation of the area under the curve?

A. Yes.

Q. How does that -- how is that compared from the heated to unheated sample?

A. So now I take that area under the curve for the unheated sample, which is now -- and once again I'm correcting it with the o-cresol -- remember I have internal standards -- so I use the o-cresol so it goes into a big formula and what will happen -- essentially what we're doing is we're comparing the quantity of 2-PE from the

from that -- from the calculations under the curve when it's unheated minus the quantity of the 2-PE in the heated sample and then that's the divided by the unheated and then you get a percentage of how much 2-PE was lost from the heated.

Q. Are you referring to something that's typically denoted as R percentage point or percentage symbol?

A. Yes, it can be R percentage or solvent loss ratio, SLR.

Q. Okay. And the SLR or R percentage is PEN minus PEH over PEN times 100 -- PE subscript "N" minus PE subscript -- I'll call it an "H," it might be a Greek symbol -- over PE subscript "N" -- which, again, the "N" might be a Greek symbol too?

A. It's not. "N" is not heated and "H" is heated. So it's pretty simple.

Q. So it's the PE of the unheated sample minus the PE of the heated sample over the PE of the unheated sample times 100?

A. Correct.

Q. Okay. So the PE of the heated sample,

is that the area under the curve for the heated sample?

A. Yes.

Q. Okay. So you're comparing the area underneath the curve for each of these two samples to come up with your solvent loss ratio?

A. Let's not forget there's a -- the o-cresol calculation is built in there too so that everything is corrected to the o-cresol level.

Q. What does the o-cresol do to correct the calculation?

A. That's built into the calculation to -- so that if I have -- so, for example, if my peak -- I call it my peak -- the curve for the ACN in the cresol -- I'll use some real numbers so we can -- so it's easier to explain. So let's say that peaks at 100, right, and the phenoxyethanol peak is at 200, now when I run the next sample my ACN plus my cresol might be at 150 and then my PE will be at 100. So now I have to correct because my standard is telling me that there's going to be some variations so that the internal standard is there to correct that value

so we're not -- it's almost you're comparing apples to apples at that time.

Q. Is this process you just described using the o-cresol to correct, is that referenced in your report somewhere?

A. I'm not sure if it's referenced in this report but it's definitely -- I mean, it's in literature. It's kind of basic chemistry. Using internal standards is kind of I would say standard in the industry for when you're doing quantitation.

Q. When you use the term ACN were you referring to acetonitrile?

A. Acetonitrile.

Q. Acetonitrile. Now, the concept underlying the analysis of the solvent loss ratio -- and I'm paraphrasing so correct me if I'm wrong -- is that ink starts out fresh and when it's fresh, it would be expected to evaporate more, right -- did I get that part right?

A. Well, you're missing a part on the end of what you're asking. So --

Q. Okay. Go ahead.

A. So the idea is if the ink the fresh that more PE will be evaporated from the heated sample.

Q. Okay. So if you have a fresh sample of ink and you treat it with heat, you would expect a large proportion of the PE-2 to cook off?

A. Correct.

Q. Okay.

A. If I can from an analogy standpoint, think about if you were to put fresh point on a room in your house and it's really hot, right. So the hotter it is, the more it will drive off that solvent when it's fresh. But once that paint is dry and it's hot in the room, you're not going to smell any solvents because it's dried out.

Q. Okay. So in order to determine that a lot of the PE-2 has cooked off, you would expect to see a relatively high solvent loss ratio, correct?

A. Yes.

Q. So is there a particular benchmark you look for in your results to determine the age of the ink sample?

A. If it's 25 percent -- if the solvent loss ratio exceeds 25 percent then you can say with a high degree of probability or a high degree of certainty that the ink is less than two years old.

Q. Okay. Why 25 percent?

A. That's the -- essentially, that's the established number that's been used in the field based on research. I can tell you that I've been -- I probably run this type of testing, I don't know, hundred times a year at least and I've done validation type samples. So I will see inks that are less than two years old that will have values in the -- you know, 15 percent plus. But the idea though is that there's kind of an error rate built into all of that so that when you have when you hit 25 percent, you have this very high degree of confidence. It allows you what we call measurement error, which is a very natural part of any kind of chemical measurements. There's going to be variation so the 25 percent is, if you will, I think the best way to put it is it's a conservative type number that allows somebody to say something with a high

degree of probability. I don't want to use the word "probability" because I don't want to connote there's some statistics involved but it's highly probable -- it's very strong evidence.

Q. We're going to delve into that a little bit more.

Are these validations that you just discussed published?

A. I have -- I certainly presented it publically and -- about my validations and also there's been a lot of work done by other researchers in this particular area too.

Q. Can I find any of those validations you just referenced in any of these published peer reviewed publications?

A. I believe that -- so I published a chapter in a text book and I believe I referenced those validations. There are peer review publications that do contain this information as well too.

Q. Can you sitting here today identify any of them for me?

A. Yes, there's one by Gaudreau and Brazeau.

Q. Aren't there some published works that relied upon a higher threshold than 25 percent?
A. Not necessarily for a two year threshold. There's a published paper that relies on 35 percent to say that an ink is less than 18 months old.
Q. Are there any with respect to the two year threshold?
A. 25 percent is -- there are some -- there are some other experts out there that will try to divvy this up a little bit more and say that it's, you know, less than twelve months, it's less than eighteen months, it's less than six months, you know, with a high degree of probability. I don't agree with that. I like to just use the two year threshold.
But there are certainly times where the solvent levels are extremely high, which I found, you know, in this particular case and I talk about this in my report. The solvent levels are very high, much higher than I would expect to see in anything that's, you know, four, four and a half years old. And in a solvent loss ratio it exceeds that 25 percent.

Q. Have you completed your response?
A. Yes.
Q. Did you just tell me that you disagreed with some of the different standards that are being used for different aging periods?
A. No, I would say that I'm more conservative. I don't necessarily disagree with the idea of it. It's not something -- I don't adhere to the idea of trying to identify with a high degree of probability that an ink is less than six months old, you know, based on a certain solvent level.
Q. Well, I'm not sure I understood that. Wouldn't be more conservative imply that you would have a higher percentage threshold for solvent loss in order be more confident in your results?
A. No, the higher -- the more conservative is using the two-year threshold. Nobody that I know of -- there's nothing in the literature that would even suggest that a value above 25 percent would indicate that an ink is more than two years old. And based on -- I've done presentations on this data as well too where I've looked at known

samples that were known to be more than two years old and I've never seen any level above 25 percent.
Q. We'll turn to that a little bit more later.
With respect to your general thesis, right, which is that for a document, you would expect to see a higher solvent loss ratio if it was a newer document, right?
A. Not necessarily.
Q. Why or why not?
A. So the way you're asking the question now almost implies that we can compare solvent loss ratios. The issue with that though is that if inks have different formulations, they may dry at different rates. So we kind of stay away from the idea of comparing -- you know, especially if inks are different formulations and then using that for each.
The other thing is that there may be -- so we can have two documents. And, once again, depending on how the ink is aging a document can be two weeks older than another document and then maybe have a much lower level with the same ink

under the same circumstances depending on when you do the analysis in determining -- what the true age of the documents are. So if they're like less than six months, we can see a lot of variation in values, you know, spanning over -- whether you did the test, I don't know, when it was five months old versus six and a half months old.
And then also depending how the document was stored. If they're stored a little differently, then you might have some different -- you might have some variation in the solvent loss ratio too.
Q. In your report you state that you had seen values in the high teens in known age samples that were less than two years old many times over the course of performing ink dating analysis hundreds of times.
You stand by that statement, right?
A. Yes.
Q. So isn't that statement, that you have observed values in the high teens for known age samples inconsistent with your overall thesis that, you would expect to see a high solvent loss

ratio?

MS. PRIMAVERA: Objection.

A. No, not at all. So my statement in my report says that when you exceed 25 percent you can say with a high degree of probability that -- sorry, a high -- with a high degree of confidence that the ink is less than two years old.

But when we start narrowing that down and we try to peg off and say, oh, well, it's highly probable it's less than 12 months or it's highly probable that it's less than six months, then you start deviating really from the conservative part about just staying with the two years.

Q. So let's stick with the two years for a moment.

If I understand the underlying hypothesis correctly, then wouldn't you expect less certainty in the aging of the sample as the percentage of solvent loss ratio decreases?

A. Not necessarily. I mean, so yes, we do use that as kind of a benchmark. But you can have an extremely high level of 2-PE but then also have a lower solvent loss ratio in and it

just depends where the ink is in its aging process, the type of ink that was used. And as I explained earlier I think we had discussed this early on in the deposition, but what happens when the ink dries is it's hardening. So if it hardens fast, you might be able you might trap a lot of 2-phenoxyethanol -- 2-PE in it. So you trap the 2-PE in there as the ink hardens and that can happen at stages. Like, if it's not fully hardened, right, and now we heat it, then we'll let all that 2-PE out.

Trying to interpret solvent loss ratio levels outside of the fact that, you know, an ink is less than two years old gets very complicated.

Q. Well, let's stick with the two year measurement you're referring to, which you mentioned was the most conservative approach, correct?

A. Yes, from a highly probable -- from a highly probable means that I'm virtually certain. As a -- I've been a forensic scientist for 29 years. I would hope that I would never be wrong about something so I want to be as conservative as possible so I like to stick with the two years

in that 25 percent threshold but there are times when, you know, let's say I have a little less confidence but I have a high level of 2-PE and I'm close to 25 percent, you know, that's still strong evidence that it's not two years old.

Q. I thought you said 25 percent is the threshold and it has to be higher than 25 percent.

A. For a highly probable. We have different degrees of conclusions.

Q. Okay. Then can I understand that to mean that you have less certainty as the percentage of solvent loss ratio decreases?

A. It will depend on the amount of 2-PE present also, whether you -- so in this particular case, I would say that the 2-PE levels were -- I'm just looking at this real quickly -- I would say about three to four times higher than what I would normally see in something that's, you know -- what I would see in something that's less than two years old.

So just to throw a number out, so one of these levels came out to 1.2 million. What I would expect to see sometimes or what I typically

would see with 2-PE levels that, you know, are showing less than two years old might be a 400,000.

Q. That 1.2 million data point you mentioned, is that in your report?

A. It's all in my -- it's in my work file in my notes.

Q. Aren't there cases where you have testified that you cannot draw conclusions from result that are below the 25 percent threshold?

A. Not a highly probable and solely based on a threshold.

Q. Went you say the "threshold," are you referring to that 1.2 million number that you just referenced?

A. No. Sorry. So it's if there's -- if there is an extremely high level of 2-PE and then you have a sample of ink or that -- you know, that's showing -- that doesn't get to 25 percent, you're confidence level can decrease. But in this particular case the ink from Q8 was the same as the ink from Q12. So we can draw some parallels with that same formulation of ink that's being used.

Q. Did you tell me earlier that you don't like to say they're the same?
A. So they're matching formulations of ink.
Q. Didn't you testify in the Malek matter that if the amount of the solvent decreases by 25 percent once it's heated then that tells you that it's fresh because you're able to drive off all the solvents?
A. In the Malek matter I believe I would have testified to something like that. I don't have my transcript. There's lot more that I had before and after I think I made that statement.
MS. COLWIN: Objection.
Q. Was there a Grosvenor matter you were testifying in?
A. Where did that take place?
Q. Give me a moment that was in the Matter of Grosvenor Property Developers Limited (In Liquidation) in the Matter of Insolvency Act 1986, which was in the high court of Chancery, which I believe is London, England.
Does that sound familiar? It's referenced --
A. Yes.
Q. -- it's referenced in your report --

both of these matters are referenced matters where you were an expert.
A. Yes, I remember the Grosvenor matter.
Q. In this matter didn't you conclude that an eight percent result -- that based on a chemical analysis you performed using duplicate sampling, the average amount of 2-PE lost in a signature was eight percent, which did not exceed the 25 percent value necessary to conclude that an ink is less than two years old?
A. Yes, with a high degree of probability.
MS. PRIMAVERA: Objection.
A. Anything less than ten percent is pretty -- I don't -- I can't say that it proves that a document is more than two years old but it's a level that you shouldn't make any interpretations from other than really it's inconclusive.
Q. Where does that ten percent number come from?
A. No, I'm just saying that based on my experience. When I get single digit numbers like that, that to me that's inconclusive.
Q. So that's based upon your independent

experience and judgment?
A. Based on performing this testing, you know, for the past 18 years and hundreds of times per year, yes.
Q. Okay. So is there any widely accepted scientific standard that reflects that a ten percent of the threshold?
A. No, I'm just saying that when I get a single digit number based on doing known -- you know, analyzing known samples, that's not a number that you can draw a conclusion from.
Q. Okay. So somewhere between ten percent and 25 percent that changes?
A. No, it all depends on the amount of 2-phenoxyethanol and that would depend on the confidence or the type of conclusion that you're going to draw.
Q. When you say it depends at least in part on the amount of 2-PE, right, what's the standard for how much 2-PE there should be?
A. So that would be based on experience and that's difficult to put because the method that I use may be more -- the way I extract the ink and the method that I use, I'm accustomed to what I

would consider to be a very high level.
Q. In the Grosvenor never matter you stated that it is requisite that the established threshold level of 25 percent be exceeded to conclude with strong evidence that the signature was executed within the past 24 months.
Do you still stand by that statement?
A. Yes. Keep in mind that in the UK we generally don't use our same conclusion area scale as we do here. But, yes, so that would be very strong evidence to be able to say above 25 percent.
And if I remember correctly in the Grosvenor matter, there was a very low level of 2-PE as well too.
Q. Well, again, the amount of 2-PE is not referenced in your report in the Grosvenor matter so I can't make that determination. I'll have to take your statement as face value for that.
A. Yeah, it was a low level. I mean, usually when getting at eight percent it will be -- you know, anything with single digits typically it would be in the low level of 2-PE.
Q. So let's talk about the sampling for a

moment. You took two samples of document eight here, correct?
A. (No verbal response.)
Q. Remember we talked about the sixteen plugs, you divided it into two trances of eight. You did a heated sample of four, an unheated sample of four and then you ran that test twice, right?
A. Correct. Q8 was the 830, 821, right?
Q. Correct.
A. Yes.
Q. So we agree on that, right?
A. Yes.
Q. And you came up with two different measurements; one for each set of samples, right?
A. Correct.
Q. And there was some variance between the results obtained between sample pairing one and sample pairing two, correct?
A. Correct.
Q. Are you familiar with the concept of standard deviation?
A. Yes, I am.
Q. Is there some reason that that concept

is inapplicable to your sampling here?
A. Because they're two levels that I got -- that I obtained, there were 33 percent and 28 percent. Both were above 25 and it averages to 31. I can tell you that a five percent difference isn't a lot of standard -- there's not lot of standard deviation in there.
No, I don't need to use a standard deviation because it will not go below 25 percent.
Q. What do you base that on?
A. Because the two numbers are 33 and 28. So it would be -- how can that -- when you average that, that's 31. So how does that go below 25 when you don't have a number below 25?
Q. What I'm asking you is how does the mean of the two measurements impact whether the standard deviation is applicable to your analysis?
A. The standard deviation applies to the mean.
Q. Are you aware that with a sample size of two the standard deviation for the sample measurements is 6.25?

A. No --
MS. PRIMAVERA: Objection.
MS. GUERON: Objection.
A. No, that's not -- when you do an average of 33 and 28 both values are above 25 so the average is 31 but it's not below -- neither of those values are below 25.
Q. The average is, in fact, 30.5, isn't it?
A. I can tell you everything is rounded because everything is plugged into an Excel worksheet. Everything is rounded to -- the other thing is mathematically when you average 33 and 28, which have no decimals on them, its improper to actually put a decimal on there.
Q. Okay. Regardless, would you agree with me that the calculation of a mean and the calculation of the standard deviation are going to give you different results?
A. Yes, of course.
Q. Have you considered the confidence interval that applies to your results as a result of the standard deviation?
A. It's not necessary because they're above 25 percent.

Q. But, again, this 25 percent is not a standard number, it's just based upon your experience, right?
MS. PRIMAVERA: Objection.
MS. GUERON: Objection.
A. No, you're mischaracterizing what I testified to here. 25 percent is something that's been established in the literature and is used by a number of other ink experts. 25 percent for two years is a -- is a well-established figure. I'm saying both of these numbers are both 25. So if I had 27 and a 23, then I would have to do the average of that right and that would be different. But both these numbers are over 25.
Q. Setting aside -- I agree both these numbers are over 25 so we're on the same page with that.
What I'm basically getting at here is how do you know you don't have sampling error when you only have two samples with a sample size of two you would have a standard deviation of 6.25, which leaves you a very wide range -- with a sample size of two measurements, how can you be

sure that you eliminated measurement error from the possible solutions here? How do you know you just haven't sampled two results that happen to be above 25 percent where as if you took more samples you might get numbers under 25 percent?

MS. PRIMAVERA: Objection.

A. So, first of all, I don't know where you're getting your standard deviation and what confidence interval you're using for that. I'm not going to accept what you're telling me is the standard deviation.

But to answer your question with respect to measurement error that's why I run the samples twice. Can we run three, four, five, six or ten times, yes. To me, with a 33 and 28 so we -- that's actually a very good level. And then don't forget what I said earlier, is 25 percent is really -- it has some error built -- it has measurement error built into it already. So when I'm above 25 percent with two measurements and both of those are, you know, what I'm seeing in terms of my data, there's consistency with my internal standard, with the blank that -- sorry, with two samples that I ran in terms of the way

they look on the GC/MS. So all of that is consistent. There is no indication here whatsoever that there would be a lot of measurement error in these two. These are actually pretty good values -- these are strong values and they're both above 25 percent. I'm 100 percent confident in the data.

Q. Well, we can we can view that differently. I understand you took two measurements and they're both over 25 percent. Sitting here today you can't tell me that if you took more measurements you wouldn't get any results under 25, can you?

MS. COLWIN: Objection.

A. Now, we can go for anything in the world that's done when you're take measurements.

I can tell you I have a very high degree of confidence in these values based on the data that I have and based on the fact that there's not a lot of deviation in these values either.

Q. Your confidence is not based upon any inferential statistic work, is it?

MS. PRIMAVERA: Objection.

A. It's based on the average value. The 33

and the 28 if we go your way could be 40 and 37. It can go in both directions. So when you say I'm not sure -- well, it be 40 percent also if we're taking measurement error in.

I have two values that are close in proximity to each other and the data -- the data is very strong and supports what I'm seeing in these values to give you an extremely high degree of confidence in the results. I have no doubt about the result at all.

Q. That's not my question. I understand that.

What I'm trying to just clarify here. Your degree of certainty is not based upon statistical analysis, it's not based upon a confidence interval based upon the standard deviation, do we a agree on that?

MR. PRIMAVERA: Objection.

A. Not really because it's based on the fact that these levels exceed 25 percent. I mean, that's -- the 25 percent has been a value that's been established really through a lot of -- you know, a lot of research, a lot of science that that is a very conservative level to

be able to say that something --

Q. Have you completed your response?

A. No.

MS. PRIMAVERA: I'm sorry, I don't think he finished. But go ahead.

A. So the 25 percent threshold level has uncertainty built into it. I've never seen a sample that was -- that was more than two years old that even exceeded 20 percent.

Q. Have you completed your response?

A. Yes.

Q. I understand that you're telling me that this is based upon your scientific experience. I'm trying to clarify that whatever science you're applying is not statistical science.

MS. PRIMAVERA: Objection.

Q. Do you have any degree in statistics or any --

A. I have --

Q. Go ahead.

A. I have minor in statistics, yes.

Q. When I'm referring to "statistics," you know what I'm referring to, right?

A. Yes.

Q. So you understand the concept of a confidence interval?
A. Yes.
Q. So the confidence that you have here is not based upon any particular confidence interval, is it?
MS. PRIMAVERA: Objection.
A. No, because I did not do the full -- I don't have to do a statistical analysis when I have two levels that are above the 25 percent threshold.
What that tells me is if you have a 28 and 33 is this -- you know, going with your argument this could just as easily be 35 and 40, right?
Q. It can be anything --
A. 28 and 33 it does not go below 25. There's no indication here that these levels are -- not to mention these are extremely high levels of 2-PE in these samples.
Q. Let me give you an analogy, okay? We can we can stipulate that it's an analogy. It's not exactly pertinent to this particular fact pattern.

For example, if you wanted to determine the temperature in a room, okay, you might take samples of the temperature, right?
A. Yes.
Q. And your certainty as to the actual temperature of the room is going to increase as you take more samples, right?
A. Yes.
Q. And if in that room there's an air conditioner on one side of room and a heater on the other side of the room then it's going to matter where you draw your samples from, correct?
A. That's a possibility.
Q. And if you take two samples and you happen to take the two samples near that air conditioning, you're going to get one set of values, right?
MS. PRIMAVERA: Objection.
A. Yes.
Q. And if you take two samples on the other end of the room next to the heater you'll get two other results, right?
A. Yes.
MS. PRIMAVERA: Objection.

Q. So can you have any degree of confidence about the temperature in the room overall if your two samples are near either of those two end points?
MS. PRIMAVERA: Objection.
A. Your analogy is completely wrong. The way your analogy should be presenting is if we wanted to know if the temperature in room was above 65 degrees and we took a measurement in one area that was 69 and the other a was 66 then we can say that with a pretty high degree certainty that it's not below 65. You're taking an absolute value and trying to statistically analyze this. This is based on a threshold value of 25 percent and both numbers are above 25 percent.
Q. Let's look at -- in your methodology you heated your samples to 70 degreed for 90 minutes, right?
A. Correct.
Q. Aren't there other published works where you heat the samples to 80 degrees?
A. So there's been research in this area if I heated the samples to 80 degrees, there's a

chance I would actually get much higher levels. The idea of using the 70 degree Celsius temperature is that we don't want to heat it too much. We just want to lightly agitate the ink because once we start heating it at higher temperatures then it could actually be drier but the high temperature will break that apart. So 70 degrees has been sort of optimized I will say that. And I did -- we did our own research when I was at the Secret Service where we tested 100 degrees, 50 degrees, 80 degrees -- we did a whole range of temperatures. We did find out that, like, 100 was way too high. You'll elicit 2-PE -- high levels of 2-PE when you start heating at 100 degree Celsius.
So 70 is an optimal temperature that's really intended not to -- if you will, not to disturb the ink too much but just to lightly agitate it. And if it's fresh, then you'll still elicit lots of 2-PE.
Q. Okay. But that's not what I asked you. I asked you if there are other papers where the samples are heated to 80 degree?
A. I'm note sure if those papers are

research papers or if they're actually, you know, papers where they use that methodology in case work.

Q. Are you familiar with the work of Dr. Valery Aginsky?

A. Yes.

Q. Are you familiar with his paper, Determination of the Age of Ballpoint Pen Inc by gas and densitometric thin-layer chromatography?

A. So I believe that was like a 1990 publication. I know Dr. Aginsky uses 70 degrees -- now he does.

Q. In that paper he used to 80 degrees, didn't he?

A. I think that was in the '90s, yeah. That's when we started -- there was a process that went on. The Canada Border Services Agency did research in this area as well. They optimized 70 and then when I was at Secret Service we liked the idea of 70 as well.

Q. Do we agree that standards change over time?

A. So that's more --

MS. PRIMAVERA: Objection.

A. As a scientist I would say that our knowledge should evolve over time, right, it gets better. So the idea that you know Dr. Akinsky was using 80 degrees back in the 1990s -- you know, we learned a lot since then.

Q. In connection with your heating of the samples, is it your position that this is a model that's generalized to all inks stored in different conditions and on different papers?

A. So there's been a lot of research looking a different papers in different conditions.

But, generally speaking, this model applies to the document that have been stored at what I would call general room temperature, indoor environment type things. So it's not -- you know, it's not intended for documents that have been, you know, stored in the extreme cold or, you know, but if a document was exposed to extreme heat then actually we probably wouldn't get values like this because it would evaporate the 2-PE.

Q. Are you familiar with the work of a Celine Weyermann?

A. Yes.

Q. Are you familiar with the paper, the Potential of Artificial Aging for Modeling of Natural Aging Processes of Ballpoint Ink?

A. Yes, and I believe that refers to dye components.

Q. There's statement in that paper that says no model can be generalized to all inks stored under different conditions and on different papers. Do you agree with that statement?

A. I would agree different conditions, yes. Like -- and I just explained that; extreme cold, extreme heat.

Q. And you're familiar with the work of Agnes Koenig?

A. Yes.

Q. Are you familiar with the paper Comparative Study of Ballpoint Ink Aging Parameters Using GC/MS?

A. I believe so.

Q. Okay. And do we agree then -- I think you mentioned this in your previous testimony -- that the shape of the curvature of an ink stroke

can impact the amount of concentrate that's lifted from the paper?

A. Yes. So the idea is that -- depending how it's curved and whether somebody is actually holding their pen on an angle when they go through that and how much they angle, yes, there's different amounts of ink that will be deposited during that sequence of writing.

Q. Okay. And in research work, ink entries are generally drawn as straight lines, correct?

A. Not necessarily. I believe there has been some research -- actually Canada Border of Services Agency where they actually had some writing that they looked at well. I know when I was at the Secret Service -- and we did research in area -- we did straight lines and then we did writing too. But it's more to help you sort of understand -- you know, this is all part of the research mechanism to control variables as much as possible.

Q. But in -- outside of a lab when writing actually hits the page sometimes the lines are not straight, correct?

A. Oh, yes, I think I explained that

earlier there's -- yes.
Q. If you have, for instance, the letter "O," isn't the solvent going to defuse differently than if you have just a straight line?
A. Not necessarily. It depends on how the "O" is -- you know how big the "O" is, where you're testing from the "O." And then once again, this is based on a microscopic analysis in making -- you know making a judgment of how much ink -- if it looks -- if it appears to be heavily inked in one area versus the other.
Q. Okay. Do you agree with the statement that higher quantity of solvents may be found in letter with dense lines compared to a straight line of the same length?
A. No, not necessarily because I think it all depends on -- so the key that's missing from all of this that -- the questions that you're raising is that if you take unheated and heated samples from the same place, right, then none of that matters. As long as you're taking adjacent pairs of hole plugs where the holes are adjacent to each other. If you're in a heavily inked area

versus a lightly inked area, that's fine. The part where you can create a lot of deviation would be if you're taking an unheated punch from one area and then a heated punch from a completely different area.
Q. I think we discussed earlier that the pen flow rate matters in terms of the results, correct?
A. If you're making absolute measurements, yes. We're not making absolute measurements because we're comparing unheated with heated all the time and those hole punches are taking from the same area. This is -- I explained a lot of this in the book chapter that I wrote on this about sampling and it's definitely important. But it's all about taking -- when you take those paired samples, making sure they're from the same area.
Q. Are you familiar with the paper by Magdalena Ezcurra, E-Z-C-U-R-R-A, Analytical Methods For Dating Writing Instruments Inks on Paper?
A. Yeah, I believe she's from South America. Is it Brazil or --

Q. I can't determine that based on her name but I'll take your word for it.
A. Not based on her name. I didn't know if the paper -- but, yeah, I know they've been doing some work down in South America.
Q. Okay. Are you familiar with her interaction plots for DR fitted means?
A. I know -- I read that paper but, no, I'm not -- I don't know off the top of my head. I would have to have that paper in front of me.
Q. Do you disagree with her work in that paper?
MS. PRIMAVERA: Objection. He didn't read it.
A. Yes, I would have to go back to this. I can say with a very high degree of confidence that I've read every paper that has to do with ink dating -- assuming that it's in English as well too. But that one -- it's been a while since I reviewed that. I would have to have the paper in front of me.
Q. Okay. Do you agree that the paper can impact the analysis -- the paper that the sample was drawn from?

A. In terms of what type of paper? Like, what do you mean by the paper?
Q. For instance, does it make a difference whether it's recycled or non-recycled paper?
A. As I mentioned earlier -- and I've done the same work my myself when we were at Secret Service. Yeah, paper can have an impact but typically the type of paper that you use isn't going to make the process slower, if you will. So usually the paper -- depending on the paper -- like highly calendar paper, very smooth paper, glossy type paper, the 2-PE will evaporate very fast from it because it doesn't really absorb into the paper as much. But none of these studies really talk about -- I mean, they don't show that that certain type of paper will actually cause the drawing to be extremely slow. And that does go for when you're comparing -- you know, obviously, when I compared Q80, I'm comparing the samples from the same paper. So once again, this is a relative comparison.
If I was comparing these samples to another page, then that's when you have to be careful in interpreting the solvent loss ratios.

Q. Are you familiar with the work of Patricia Giebink, G-I-E-B-I-N-K, Erich Speckin, Jason Harner, The Dating of Writing Inks Through 2-phenoxyethanol?

A. That's a not a peer reviewed published paper though.

Q. Are you familiar with that work?

A. I am familiar with the work. They presented it at a meeting but it was never peer reviewed and published.

Q. Have you critiqued that work?

A. Probably, yes.

Q. Do you -- are you familiar with conclusions in that paper?

A. I wouldn't trust the conclusions in that paper, it's never been peer reviewed. I believe that's a paper from 2000 -- maybe mid 2000s -- 2010, '11, something like that. They never produced any other data.

Q. Do you agree with the statement that the long-term behavior of solvent evaporation isn't well-known or understood?

A. It depends how you determine long-term. I think -- I would say it's pretty well

foundational that the two year threshold is something that everybody is comfortable with. If somebody found high levels of 2-PE in a document that was greater known to be greater than two years, they would publish that very fast, as would I.

Q. Are you familiar with the paper again by Celine Weyermann, Joseph Almog, Jurgen Bugler and Antonio Cantu?

A. Yes.

Q. Entitled Minimum Requirements For Application of Ink Dating Methods Based on Solvent Analysis in Case Work?

A. Yes, I'm aware of all of those authors. Specifically I trained under Dr. Cantu.

Q. Dr. Cantu is a well-respected person in this field of study, correct?

A. He's well-respected, yes. I trained under him.

Q. As is Dr. Aginsky, correct?

A. Dr. Aginsky, we have some -- I will say we have some differences. But I would say that a lot of the work he's done in this filed has been instrumental.

Q. Isn't he the inventor of this 2-PE solvent loss ratio methodology?

A. Not necessarily would I call him the inventor. He certainly had a big part in moving this. The way I would characterize this is there's been a lot of research in this area that added on to Dr. Aginsky's initial finding. But really where it all started was back in the 1980s by a gentleman by the name of Larry Stewart and sort of built from there.

Q. Is Celine Weyermann respected in this field of study?

A. Celine Weyermann -- I know Celine very well, she's a researcher. She doesn't do case work so she's used to working in a research environment but I know who she is.

Q. Okay. Turning back to the paper I just mentioned, Minimum Requirements For Application of Ink Dating, there's a statement in that paper that says, moreover, the time span that can be considered to date inks through solvent analysis using GC/MS is seriously questioned in the forensic community.

Do you agree or disagree with that statement?

A. I would have to -- I would have to see what the statements are before and after what you read me. But what I would agree with is that the timeframes of using three months, six months, nine months, twelve months, eighteen months, there's -- I would say there's a fair amount of contention with that. But the two year timeframe, like I said, I'm not aware of anybody that's ever said that when you look at -- you can examine a document that's over two years old and you'll have high levels of solvents in them.

Q. The next very next line in that same paper says, Brunelle and Crawford stated the that ink dating dated technology which is based on GC/MS analysis cannot be used to date inks over six months old and Bugler et al recommended to analyze ink with a maximum age of three to four months.

Do you agree or disagree with that statement?

A. I totally disagree. Brunelle and Crawford was a -- Brunelle was doing ink analysis back in the 1960s and he's been retired for, I don't know, 30 -- 25, 30 years. So their assessment of GC/MS is based on very old

technology.

In terms of Bugler, the method got a little more perfected in terms of determining that. I think a perfect example would be -- we've all had -- all of these people that you're mentioning, if they worked in operational laboratories you would see -- you do see occasionally levels that are going to be very hike, depending on the ink, that are going to be -- you know, more than four or five or six months old.

Q. Are you familiar with the paper entitled The Dating of Writing Inks Through 2-Phenoxyethanol Using Gas Chromatography-Mass Spectrometry by Patricia Giebink, Erich Speckin, Jason Harner?

A. One again, that's not peer reviewed so --

Q. Is that the same paper we were talking about earlier?

A. I don't know if it's the same paper but I know they never published anything so...

MR. BERMAN: Toni, can you pull up the document in the third e-mail I sent you,

it's entitled At Six Years.

Q. Mr. LaPorte, I'm showing you an excerpt from that paper -- the citation is actually listed below the table. The banner at the top was applied not by the paper, we added it on there, just to be clear.

A. Yes, to confirm -- and I assume you know that this is not from a publication -- a journal publication.

Q. This is from another form of paper prepared by scientists in your field, correct?

A. I'm going to politely say these people are not qualified. They have no -- they haven't proper training in this particular area.

Q. In your field isn't it true there are very limited number of testifying experts on the subject of ink dating?

A. Yes.

Q. Isn't Erich Speckin one of those testifying experts?

A. He's a testifying expert but his opinions have been criticized by courts all over the world so I don't -- I know Mr. Speckin. This data -- like there's no -- first of all, these

are absolute measurements so I just -- there's no data here review other than some numbers, which I can tell you just looking at the numbers for their concentrations, these are low level concentrations for these inks.

Q. Okay. So you draw different conclusions than these particular individuals did in this paper?

A. No, I think that would be incorrect to say that I draw conclusions. What I'm saying -- I wouldn't draw conclusions from this. This isn't data.

Q. Okay. Are you familiar with the work of Carina Maria Bello De Carvalho? There's a paper -- there's a paper entitled Figures of Merit Evaluation of GC/MS Method for Quantification of 2-PE From Ballpoint Pen Ink Lines and Determination of the Influence of Support Paper on Solvent Extraction?

A. I'm not aware of that publication. Do you have -- can you pull that one up?

Q. I believe I can. Hold on a second here. Actually, I don't think that's one of my slides. There's a statement in the paper where they took

about the detection limits obtained for their study and they talk about the limits of reliable measures of 2-PE.

Are you familiar with papers discussing those points?

A. I would have to see that paper and what their limited detections are.

Q. I think we can probably -- you know what, let's skip that one for now.

We talked earlier about Bugler and some other authors, right?

There's another paper that I've seen by Bugler, Buchner and Dallmayer, are you familiar with their works?

A. Yes.

Q. They make a statement in that paper -- I'll read the quote, it says, quote, these authors maintain the methods applied until now in which a ratio is made between the amounts of PE found in two samples of the same ink, one without treating and another heated, may have significant error due to possible variations in the two samples removed from the same ink.

A. Yes, so the key is "up until now." So I

worked with Dr. Bugler when I was in the Secret Service, we worked together on some samples and we worked with the Canada of Border Service Agency. This is when we were trying to optimize the sampling. One of the things that came from that is when you take samples to do adjacent samples, when you take them in pairs.

Q. Okay. There's a paper -- it's a paper by Magdalena Ezcurra, we discussed previously, Analytical Methods For Dating Modern Writing Instrument Inks on Paper.

Are you familiar with that work?

A. I know her work. I would have to see that paper.

Q. They're talking about the evaporation of solvents in ink to achieve an approximation of age of the ink. And there's a statement in there that says, this method is based on publications by Aginsky, 1996, and can be applied to determine if an ink that contains PE as a solvent has been entered on the paper in a period previous to a year since the analysis is performed. Does that sound familiar?

A. Yes. So once again, I mean, they say a

year and this is what I explained earlier in my testimony is that I use that two year limit to be extremely conservative to minimize the potential of a false positive. I mean, our goal -- at least my goal -- I can speak for myself is I never want to make an error. I never want to have a false positive. I'm sure I can get it wrong many times when I get a level that's below 25 -- I shouldn't say "get it wrong" but that's an inconclusive level if you have, you know, of course, like I explained like single digits but that can never mean that it's generally -- that the ink was generally done more than two years ago. So we kind of -- you know, through all of this research that you've been pointing out, we -- to me the two year threshold or that two year level just gives you a lot of security.

Q. Do you know whether either of the two samples --

MR. BERMAN: Withdrawn.

Q. Do you know whether either of the two documents that you reviewed, Q8 and Q12, do you know whether either of them were on recycled paper?

A. Q8 was on -- I believe it was on notepad paper so I don't know if it's recycled or not. And Q12 was a printout I think from a printer. I don't know if that was recycled paper either.

Q. Do you agree that recycled paper may contain more PE-2?

A. No -- I test paper samples before I do my testing. My paper samples didn't show any 2-PE. That's during the quality control process.

Q. So your blanks contained no PE at all?

A. Correct.

Q. Is that reflected in your report somewhere?

A. It's certainly in my notes.

MR. BERMAN: Toni, can we show him the slide in the third e-mail that's titled "Recycled Paper May Have More PE-2."

Whatever documents we showed Mr. LaPorte today -- so far we showed him his expert report, which we had marked as Plaintiff's Exhibit 1.

Was the last document we showed him -- the second document that we put up today? Mark that as LaPorte Exhibit 2 and let's

mark this one as LaPorte Exhibit 3, please.

(LaPorte Exhibit 2 and LaPorte Exhibit 3, marked for identification.)

Q. So are you familiar with this paper by Carina Maria Bello De Carvalho?

A. Yes, I saw -- I'm vaguely familiar with this one.

Q. And just to be clear, the green highlighted material on the left, that's not part of the paper. That was applied on our end.

A. Yes.

Q. So there's a highlighted line on the right panel, do you see that where it says, relating to the experiment's testing the influence kind of paper on 2-PE concentrations, it can be concluded that the kind of paper exerts importance in the 2-PE quantification.

Do you see that statement?

A. Yes.

Q. Do you agree or disagree with that statement?

A. So I disagree with the idea that this would be applicable in my case. First of all, I ran paper solvent -- I ran paper blanks so I,

obviously, didn't get any 2-phenoxyethanol that would be significant enough for me to stop my testing.

But secondly, this is comparative method -- this is a relative comparison. So if I'm taking samples and analyzing those in doing the heated and unheated and the paper is by chance contaminated, I'm getting the same contaminations on both samples so it does have an effect.

The other thing is I don't know where they got their paper from. I believe -- I don't know where she is from -- I'm not sure if she's actually from Spain or from South America but I don't know where they got their paper from that would show, you know, contamination of 2-PE. I don't know how old their paper was -- how old was the paper? Was it fresh out of the package? And I don't know where it was manufactured. If it's manufactured in a place where they have print ink also or if the printing ink is coming through from the wrapping that's labeled. There's a lot of variables. I'm a little speculative about this statement.

And then also too, I will say this has to do with measuring absolute values of 2-phenoxyethanol. I haven't seen any of their data that they ran in their laboratory. Did they run blanks on the GC/MS? Is this contamination from the GC/MS or is this really truly from the paper. So I have a lot of questions about this.

Q. You seem to be inferring this paper is about contamination, am I misunderstanding?

A. No, it's about what it seems to be about is that if you test recycled paper you can get 2-PE. What I'm saying is it could be contamination in the samples that they ran. I don't know that.

Q. Okay. If you look at the last sentence on the right panel it says, in part, recycled paper will become a routine paper in offices and the aging behavior of pen inks in this kind of paper should be studied. Do you see that sentence?

A. Yes, I see the sentence.

Q. So doesn't that indicate that they're talking about the aging behavior of pen inks rather than contamination?

A. No, it sounds like they detected 2-PE in the paper. All I'm say is I'm not privy to all of their data and how they did their analysis and whether that 2-PE is truly in the paper. You would have to show me that the paper industry is using 2-PE in their paper production. And these don't seem like significant levels.

Q. I want to draw a distinction for you between two different concepts.

The first concept being the one you've identified, which is whether there is 2-PE in the paper itself, right? Let's call that concept one.

Concept two would be whether the tape of paper that the ink is on affects the aging behavior of that ink.

Do you understand the differentiation between those two concepts?

A. Concept two depends on concept one.

Q. Well --

A. What they're suggesting, right, is that the paper contaminated and we should do more studies to understand the aging characteristics of the ink. What I'm saying is I don't know if

concept one is actually -- you know, if that's feasible to begin with.

How many pieces of paper did they test? Did they confirm with manufacturer this paper has 2-phenoxyethanol somewhere in the manufacturing process. That's what I would want to know.

Q. I think I understand your response on that point.

What I'm asking you is something a little bit different, which is if you have recycled paper that does not contain any 2-PE of its own, can that fact that there's recycled paper affect the aging behavior of pen ink applied to that paper?

A. If anything, I think I said this two or three times already, but it wouldn't be expected to make inks stay fresh for more than two years. Are there differences in paper? Absolutely, I've already -- you know, I've already testified to that, that there are going to be differences in paper and how inks dry on those papers. I'm not debating that at all. But is there any evidence that -- is there going to be any scientific study that shows that a certain paper will cause an ink not to dry, I'm not aware of that.

Q. Okay. Do you agree that samples may be contaminated through solvent migration?

A. So solvent migration is where you have writing and that can contaminate sort of the paper around the writing.

Now, when I did my testing I removed paper blank samples from around the writing to determine whether there was any significant contamination. I didn't -- I certainly didn't detect that.

Q. Well, can samples be contaminated through any other means?

A. They could if you had other pieces of paper, you know, put on top of them, sure. But once again, we're do a comparison of the unheated and the heated. So the idea of cross contamination with an unheated and heated when I've done -- when I've actually performed testing on the paper that's adjacent to where I do the sampling, then that -- that's not likely in this particular case. And I would say like almost impossible in this particular case.

Q. Do you agree or disagree that contamination can occur from other sources of

2-PE in the environment where the document is stored?

A. No, not the way you stated that. No, I don't agree.

Q. And what is about the way I stated that makes it more or less agreeable?

A. You said "in the environment," what does that mean?

Q. So for example, don't other common household products contain 2-PE?

MS. PRIMAVERA: Objection.

A. So that's possible. I published a paper on this and that -- you know, there are clones an perfumes and things like that that can contain 2-PE. But that's why we do paper blank samples to determine whether that's possible -- the possible case.

Q. Okay. Does solvent loss ratio decrease uniformly with the age of a document?

A. No, not -- so it depends on how you define uniformly. But the way I understand uniformly, no.

Q. Is it sometimes the case that solvent loss ratio may increase over longer periods of

time?

A. I've never read that. I've never heard of that.

Q. Are you familiar with the work Agnes Koenig, Sophie Magnolone aging and Celine Weyermann, Comparative Study of Ballpoint Ink Aging Parameters Using GC/MS?

A. I would have to see the reference. I mean, I'm familiar with those authors but I would have to see this reference that you're -- that you're referencing.

Q. Well, if solvent loss ratio isn't uniform over time, right, and you're taking a ratio of a heated and unheated sample, then the ratio of change for the heated sample versus the unheated sample can change as the shape of the curve changes, right?

MS. PRIMAVERA: Objection.

A. Not necessarily. I mean, there can certainly be -- you know, there can be what I would call measurement error and variation. But it depends on how many measurements you're taking and how often you're sampling or what the difference is in the sampling. But the idea that

2-PE -- the solvent loss ratio would actually rise or increase over time makes it -- it logically, scientifically doesn't make any sense.

Q. Well, it would be inconsistent with the theory that you described with the fresh ink showing a higher loss ratio, right?

MS. PRIMAVERA: Objection.

A. It depends if we're taking those samples from exactly the same place, which would get very difficult as you're doing this. No, that just doesn't make any sense to me. And I haven't see any research that would suggest that solvent loss ratios increase over time as a function of the ink.

Q. But there this paper that I referenced by Koenig, Magnolon and Weyermann; have you reviewed that paper?

A. No, I would have to see what you're referencing. I would have to review what they're -- exactly what they're stating and how they measured that.

Q. Okay. Are you familiar with a paper by El-Sabbah, also by Gomaa and El-Hefny and Al-Hawary, Dating the Ballpoint Pen Ink Using Gas

Chromatography-Mass Spectrometry Technique?
A. I'm not sure I'm aware of that paper. I would have to see it.
Q. Okay.
A. And maybe read the abstract on whether -- I can't recall -- I can tell you right now I can't recall that paper.
Q. All right.
MR. BERMAN: Just a moment please. I might have a slide -- yeah.
Toni, can you show him the slide labeled Inks Have Widely Varying -- and it continues on from there. Let's label this please.
(LaPorte Exhibit 4, marked for identification.)
THE WITNESS: Can we take a five-minute break?
MR. BERMAN: Absolutely.
(Whereupon, a brief recess was taken.)
Q. Mr. LaPorte, I am showing you an exhibit that's marked LaPorte Exhibit 4. Again, the information on the left hand panel, we applied that, that's not part of the underlying material, okay, just to be clear.

This is a slide that contains information from that paper listed below the graphics, right, where it says figure seven. This is from that paper Dating Ballpoint Pain Ink Using Gas Chromatography.
Have you seen graphs of nature before?
A. I have, yes.
Q. It's a little bit small but I'll represent to you, for example, that on the top left panel marked A there's an inset there says the BIC pen at 24 degrees C and underneath that it says BIC pen and 70 degrees C. Can you see that?
A. I can't see that, no.
MR. BERMAN: Can you blow this up larger, Toni, so that the graphs are more visible?
Q. Are you familiar with the paper this is excerpted from?
A. No. Once again, I think I would have to see the front of the paper and then the abstract.
Q. Okay. My understanding is that in these charts the top line is black and the bottom line is red. Do you see that?

A. Yes.
Q. Okay. And that the black line represents an unheated sample and the red line represents a heated sample?
A. Yes.
Q. And then this appears to have on the X axis time. Are you familiar with what the right axis is showing us?
A. First of all, what is the -- the X axis timing what?
Q. Let me see if I can discern that. In months.
A. What are those numbers on the bottom?
Q. It appears to range from negative 5 to 40, depending upon the chart. So some of them go from negative five to thirty. For example, panel A goes from negative 5 to 35 months on the X axis whereas panel -- I lost my place.
A. What is negative five in time?
Q. I think it's just -- there's no such thing but you, obviously, can't have negative months but I think it's just, you know, your transposing the start points a little further to the right on the chart?

MS. GUERON: I want to object to this entire line of questioning because none of us can even read this document. I just don't think it's appropriate. I understand technology makes things hard. I can't let this questioning go un-objected because I can't even see what we're talking about.
MR. BERMAN: Let's take a moment to remedy that. Hold on a second.
(Whereupon, a brief recess was taken.)
MR. BERMAN: Let's mark this as LaPorte Exhibit 5.
(LaPorte Exhibit 5, marked for identification.)
MR. BERMAN: Please allow Mr. LaPorte to guide you to the portions that he would like to look at.
Q. The chart I would like to look at when you're ready is on page 393.
A. Can I just sort of caveat this up in the front. None of these people are forensic chemists's. It's coming from the agriculture department and these people are not experienced in this methodology. So I am just going to put

that on the record right now.

I'm sorry, is the ball in my court right now or --

Q. Yes, Mr. LaPorte, you indicated you wanted to review the abstract and other portions of the paper.

A. Yes, can we see the graphic now?

Q. Yes, the graphic is on page 393.

MR. BERMAN: Please feel free to guide the court reporter to any portions you want to review first and when you're ready for the chart, we can have her flip to that page.

THE WITNESS: Can we just scroll down to the next paragraph after this. Can we go to the methods section real quickly?

MR. BERMAN: Where is that? Can you scroll down?

THE WITNESS: Scroll down. There we go.

A. So I will just say that a lot of this isn't going to be applicable because they removed their samples with a scalpel. As you can see in the artificial aging part they say two one centimeter samples of the examining inks on paper

are removed using a sharp scalpel. That's not a generally accepted method for analyzing inks because we do the hole punches. So you'll create a lot of variation in your data when you're cutting and excising lines off the paper plus you're removing too much paper at the same time as well too.

THE WITNESS: Can we go ahead and scroll down I guess to the graphs. That would probably in the result section I assume, which should be up next.

MR. BERMAN: The graphs are on page 393.

A. So now I can see the graphs. Do you have a question now?

Q. So, again, just turning to panel A you can see there's a black line, which they have in the inset of the panel described as a BIC pen at 24 degrees C and underneath there's a red dash line, BIC pen at 70 degrees C; do you see that?

A. Yes.

Q. Now you can see the X and Y where the X is time in months and the Y axis is abundance in it looks like N-G, does that make sense?

A. Nanograms.

Q. In the different panels here we have what appears to be different inks that are used. So, for example, panel C is the Staedler pen at 24 degrees C and at 70 degrees C, right?

A. Yes.

Q. So, for example, in panel A, are you able to tell me what the black curve -- the black line curve represents?

A. Well, I mean first of all we have some data here with 24 degrees Celsius and that's about 75 degrees Celsius. That's typically above what you expect room temperature. The other thing is I don't know how the -- well, I mentioned this already, that they excise the sample by removing these, you know, streps of ink, which to me is just kind ruins the whole experiment. And then also too -- I mean, I -- so -- think about it this way, if you're removing one centimeter of ink -- like the whole line, how can that be consistent because you would be taking one centimeter and then measuring that and then taking another centimeter and then heating that and measuring it. The other thing is I don't know how they heat their samples and that

can be important in the process. But you're not going to have consistency between heated and unheated if you're separating everything by a full centimeter. That's a lot of distance in an ink.

Q. Have you completed your response?

A. Yes.

Q. So with understanding that you have certain critiques of their methodology, right, do these panels generally reflect different curvatures for the abundance of PE over time in different ink types?

MS. GUERON: Objection.

A. I mean, I would say sort of generally speaking, you know, these curves are -- they're not a big surprise. But, of course, if you're not doing the methodology properly then you're going to see some variances in those curves that can really cause a lot of distortion in the curve.

But, generally speaking, the idea of the curve starting at high and coming down low is what you would expect as an ink ages.

Q. Have you completed your response?

A. Yes, sir.
Q. I'll direct your attention to panel C, the red line which reflects a Staedler pen 70 degree; do you see that?
A. Yes.
Q. Do you see the curvature starts increasing after a certain point in time where the curve actually from 25 months onward goes up?
A. The ratio actually gets smaller as you see the red comes closer to the black so the difference is going to be smaller as it gets older, yes.
Q. Contrast that against panel F, right? In panel F we see the opposite, don't we, where the divergence between the two increases over time?
A. I can't see F.
MR. BERMAN: Can you scroll down, please, Toni. Panel F reflecting the Luxor pen at 24 degrees and 70 degrees.
A. Like I said, I wouldn't trust this data per se. I'm okay with the general curve but I don't trust the data. And then also we don't know if that variance is less than 25 percent or

more than 25 percent.
Q. Okay. Are there other materials in the scientific field that show divergences of the heated and unheated samples increasing over time?
A. I'm not aware of that. If it's done using the same methodology that I'm using. You know, you're not excising one centimeter lines, you're using hole punches, you're taking adjacent samples, all that. I haven't seen anything like that.
Q. Okay. Prior to today have you seen this paper?
A. I don't -- you know, I don't recall this paper.
Q. So you're not sure but you're not familiar with it independently of me showing it to you now?
A. Once again, I don't -- I don't recall. I don't recall this paper. Can we go back up to front to see where it was published?
Q. Yes, you can. It was Egyptian Journal of Chemistry.
A. Yeah, that's not a journal that I typically read. But I do peer reviews and I want

to be careful that I don't disclose anything I shouldn't be. But I do peer reviews for a lot of different journals on these types of articles. I haven't -- I don't recall seeing this.
Q. Okay. Did I understand you to be telling me the Egyptian Journal of Chemistry is not peer reviewed?
A. No, no. I'm saying I do peer reviews. I get called by a lot of journals to do peer reviews for them.
Q. Okay.
A. But this one, no, I'm not aware of this. I don't know if I just saw the article and I don't recall or -- I think it's easier for me to say I just don't remember seeing this.
Q. That's fine.
MR. BERMAN: You can put this one down, Toni.
Q. You mentioned that you do peer reviews. When was the last time that you were published in a peer review study?
A. I'm sorry, the last time I published?
Q. Yes, in a peer review study.
A. I would say the last time would be --

well, I wrote a chapter in a textbook. I don't remember when that was published. I don't remember specifically. I would have to look it up.
Q. Okay. Is that the same chapter you referenced earlier?
A. Yes.
Q. Okay. Are you aware of any studies examining the uptake rate of PE-2 by ink as opposed to paper?
A. (No verbal response.)
Q. Is my question clear? I can rephrase it.
A. No, it's not clear.
Q. Okay. So before we were talking about potential sources of contamination from the environment that the document was stored in.
Do you recall some questioning on that subject matter?
A. Yes.
Q. We had a discussion how you take hole punches from both the portion of the paper that has the ink on it as well as the portion of that is blank, right?

A. Yes.
Q. And the rationale for doing that is, at least in part, to control for possible environmental contamination, right?
A. Yeah, to understand if there was some potential contamination that could affect your results?
Q. So just in taking an extreme example, if someone spilled some perfume with PE-2 on a document, you would expect it to be reflected on the blank if it had happened as well as on the ink portion, right?
A. Correct.
Q. So, obviously, moving away from that extreme example, in a case where -- in a situation where there was PE-2 in the environment but perhaps is it -- do you know whether PE-2 can be carried in the air?
A. So although it's a volatile organic compound that typically implies it volatiles pretty quickly once it hits the air. That's speculative I would say, that question. But I can't imagine that 2-PE is floating around in the area very much.

Q. Okay. Obviously, in like a well-ventilated room or something like that it would never be expected to happen.
But what about like in a closed desk you draw?
MS. PRIMAVERA: Objection.
MS. GUERON: Objection.
A. I mean, that just wouldn't make sense to me. And then it like suddenly lands on the ink?
Q. Well, are you aware of any studies that have assessed whether there's any difference between the absorption of environmental contaminated PE-2 by ink versus that of paper?
A. No.
Q. Okay. Are you aware of any studies finding the solvent loss ratio becoming less stable in older documents?
A. What does "older" mean?
Q. Well, there's a document by Koenig, Magnolon and Weyermann entitled A Comparative Study of Ballpoint Ink Aging Parameters Using GC/MS, are you generally familiar with that?
A. Yes.
Q. And in that document's abstract they

make a statement that for many -- excuse me -- for more than a decade scientists try to develop methods capable of dating ink by monitoring the loss of PE over time while many methods were proposed in the literature, few were really used to solve practical cases and they still raise much concern within the scientific community.
Do you agree or disagree with that statement?
A. I would say I partially disagree with that statement.
Q. Okay. Later on in the abstract -- would you like to clarify for me which portion you disagree with?
A. I would have to understand a little bit more about exactly what they're saying. What they don't come to a conclusion is that a solvent loss ratio above 25 percent will occur in a document that's greater than two years old. That I know is not said in there.
Q. There's a statement in the abstract says, surprisingly our results showed that our percentage was not the most reliable parameter, as it showed the highest standard deviation.
Do you agree or disagree with that statement?

A. It depends on what they mean, do they mean over time as a predictor of age?
Q. Are you -- would you need to see the paper to know that or are you familiar with the work?
A. I'm fairly familiar with the work. It has nothing -- it does not imply that the solvent lost ratio increases above 25 percent when a document is over two years old. It may fluctuate in between but it's not going to have something to do with the measurements the way it's being taken. I'm not sure if they used hole punches or if they extracted with a scalpel.
Q. Well, are you familiar with Weyermann?
A. Yes.
Q. Isn't she a forensic criminologist?
A. No, she's a researcher.
Q. This particular article was published in -- University de Lausanne?
A. Lausanne.
Q. Isn't that a criminal forensic school?
A. They have criminal lists there but Dr. Weyermann does not -- as far as I know she doesn't engage in operational -- she doesn't work

in an operational laboratory, she's a researcher.
Q. Are you familiar with Forensic Science International?
A. Yes.
Q. Is that a well-regarded scientific publication?
MS. PRIMAVERA: Objection.
A. I don't know if I call it well-regarded in a sense -- it depends on what the article is. Are there articles that are published in there that I agree with, yes. Are there articles that published in there that I think that are not great science, yes.
Q. Do you know if works in that publication are peer reviewed?
A. I believe so, yes.
Q. You're not contending that this article is not peer reviewed, right?
A. No, I'm not contending that.
Q. All right. Are you familiar -- never mind -- we already asked about this paper.
Are you familiar with a 2017 work in Science and Justice also by Agnes Koenig, Celine Weyermann entitled Ink Dating Part II

Interpretation of Results in a Legal Perspective?
A. I am familiar with that, yes.
Q. Are you aware that that article discusses the use of a 50 percent threshold?
A. Not for two years.
Q. Okay. Are you aware of studies reporting false/positive results for the R percentage parameter?
A. So false/positive in what terms? Did they conclude that a document was less than two years old when it was factually more than two years old? I'm not aware of that.
Q. Let me give you a quote from the paper. It says, thus, two values of 38 and 35 percent were reported for two different seven year old samples yielding false/positive results when using the 35 percent threshold less than 18 months?
A. I'm not aware of that. Do you have that study? I would like to see how they did their testing.
Q. So you're not generally familiar with that paper?
MS. PRIMAVERA: Objection.

A. I don't -- is it peer reviewed and published?
Q. It's published in Science and Justice 2017. Do you know whether that is peer reviewed?
A. I don't know but -- I'm not going to contend that it is or isn't. I would like to see that article and understand exactly how they did their testing.
Q. Okay. So without more information you can't tell me whether you agree or disagree, correct?
A. Correct.
Q. Is there any pear reviewed publication that reports that after 24 months PE no longer evaporates at a significant or measurable rate?
A. There is a publication, yes, that essentially says that. Yes.
Q. What publication is that?
A. Gaudreau and Brazeau.
Q. Do you know what date or what approximate year that came out?
A. I don't remember the year. It would have been sometime in the early to mid 2000s.
Q. Do you know of any other papers that

come to that conclusion?
A. I think there's a lot of papers that it may be in there. It may be in the paper somewhere but it's not necessarily part of the hypothesis of the testing, they'll use it as foundational.
Q. When you -- when you tell me they use it as foundational, what does that mean?
A. It means that's not what the testing is all about. I mean, that's not -- the test that -- those are more -- that's more informative information that's been developed over the years.
So when you say is there research to show that, somebody probably wasn't doing that research. But I would say, generally, that's a fairly accurate statement.
Q. In your report you make the statement after 24 months PE no longer evaporates at a significant or measurable rate and you don't cite any scientific work for that proposition?
A. That's Gaudreau and Brazeau and I believe I have a publication that states the same thing too.
Q. When you say you have a publication,

what do you mean by that?
A. I have a publication that states that same thing that I cite Gaudreau and Brazeau from it.
Q. When you say you have a publication, does that mean you have a copy of a publication authored by some other author or you wrote one?
A. No, I authored it.
Q. You wrote a study where you came to this conclusion?
A. Like I said, it's general but, yes -- so it's a general agreement that really after 24 months these inks are completely dried out unless they were stored in some irregular environment.
Q. So the manifestation of that general agreement would be the Gaudreau article you referenced?
A. That's where it starts. And then there's -- like I said, there's more articles that when show -- when you seize the data that it coincides with the data. I'm not aware of any publication that has debunked that idea.
Q. In your report -- I think I asked you

about this -- excuse me, let me just go down.
In that in an article by Weyermann, Almog and Bugler and Cantu in Forensic Science International, 2011, they make the statement, to present date no two laboratories that do ink dating via solvent analysis use the same method.
Do you agree or disagreement with that statement?
A. That was 2011. So I don't know -- I can't comment on whether laboratories have come together. I do know that there are always some -- you know, this is not uncommon in just about any chemical analysis where there might be some differences -- some variations in the methodology.
Q. Am I correct that you agree that there are some variations in methodology from lab to lab?
A. I don't -- I can't say for sure. I don't know what every lab is doing. I know what I do and I know that I validated my own procedure and I've used -- I know there are other ink chemists that -- other test finding ink chemists that use something similar.

Q. Are there other ink chemists that are testifying at experts that you can consider to be at your level?
A. I don't know what you mean by "at my level."
Q. I asked you earlier about, for example, a paper written by Erich Speckin, remember that?
A. Yes.
Q. And effectively you told me you didn't consider him qualified, correct?
A. No, that's -- I mean, I wouldn't want to characterize it as not qualified, that's not my job as an expert when you say "not qualified." The paper we were talking about was not peer reviewed. There's no data to sort of back it up. It was a paper that was based on making absolute measurements.
Q. Let me try to frame it as a more objective question to make it perhaps easier and more clear.
Your testimony as a forensic ink dating expert has been accepted in federal courts in the US, correct?
A. Yes.

Q. How many other experts in the same subject matter are you aware of whose testimony has been accepted as expert testimony in federal courts in the US?
A. I don't think -- I mean, I can't -- I can't comment on that because I don't know for certain on whether or not their testimony has been accepted in Federal Court.
Q. Do you know whether Mr. Speckin's testimony has been accepted in Federal Court?
A. I actually don't know that for sure.
Q. Do you know whether Dr. Aginsky's testimony has been accepted in Federal Court?
A. I don't know for sure. I would -- my guess is yes.
Q. Are you familiar with a forensic ink dating scientists named Lyter, L-Y-T-E-R?
A. Yes.
Q. Do you me know his first name?
A. Albert.
Q. Yes. Do you know whether his testimony has been accepted as expert testimony in the US?
A. I can tell you I was involved on the opposing side of that case in the Souther

District of New York where -- if you read that -- if you read that ruling clearly, there were he lacked quality control procedures and there were other things that made the analysis unreliable but the method itself -- I don't -- I don't recall specifically if there was an issue with just the method itself other than he forgot -- not forget -- he neglected to run quality control samples and some other things. But -- so I'm going to leave it at that.

Q. Your referring to the case where his testimony was discredited because he didn't take the blank paper samples, right?

A. Correct.

Q. So other than yourself, are you aware of any forensic ink dating experts whose testimony has been credited as expert testimony in Federal Courts in the US?

A. Well, once again, I mean, I don't keep track of other experts and their testimony and whether it's been accepted or not. Sometimes it may not even involve ink dating. So I don't know. He would probably be -- you can probably get that information a lot easier than me.

Q. Thank you. Is there a standard formula for ballpoint pen manufacturing for the ink that's used?

A. I'm sorry, I don't understand the question you're asking.

Q. Let me phrase it differently. Do the solvents used in commonly available inks vary?

A. Yes.

Q. Do the dyes vary?

A. Yes.

Q. Do the resins vary?

A. Yes, but not a lot.

Q. Okay. And they vary from brand to brand?

A. They can.

Q. And they can vary from region to region?

A. I don't know if I use a region to region if it's the same manufacturer. They may -- it depends on -- let's say you sell -- BIC sells pens in Arizona that's a dry climate versus a highly humid climate, the company may sort of alter their solvents in those but I don't know that for sure.

Q. Are you familiar with Brazilian Journal

of Forensic Science Medical Law and Bioethics?

A. I am not.

Q. In the paper they published in January of 2017 they stated that solvents, dyes and resins may vary between different brands of pens and may vary from region to region.

Do you agree or disagree with that?

A. I don't have a basis to disagree with that.

Q. Okay.

A. I would want to know where they got their information from but.

Q. In your analysis of the Q8 or Q12 document, for either document, were you able to identify the formula for the inks used in those documents?

A. I did not identify the formula specifically.

Q. Are you familiar with an Excurra paper written with coauthors entitled Analytical Methods For Dating Modern Writing Instrument Inks on Paper in 2010 in Forensic Science International?

A. I believe I have seen that article.

Q. In that article they're talking about a Gaudreau, Brazeau article -- Gaudreau is G-A-U-D-R-E-A-U and Brazeau is B-R-A-Z-E-A-U.

Are those the authors you referenced earlier today?

A. Yes.

Q. There's a statement in that article that says, "Nowhere throughout the cited article are the volatile compounds corresponding to the analyzed peaks A and B specified. However, in the bibliography below, so much LaPorte's, L-A-P-O-R-T-E, as Gaudreau-Brazeau indicated phenoxyethanol PE as one of the volatile compounds to which Stewart refers, S-T-E-W-A-R-T -- it continues on -- I'm not breaking up the quote -- this method has two clear limitations: First, that the formula of the problem ink needs to be identified and obtain information on its volatile compounds through the industry; second, the importance of storage conditions of both inks. Known and questioned inks cannot differ if a comparison is intended."

Do you agree or disagree with the material in that quotation?

A. I disagree with that.
Q. Which part or parts do you disagree with?
A. I disagree with the idea you need to know the formula.
First of all, it sounds like you've done some reading on this but this method is called the dynamic method and the dynamic method has nothing to do with ink formulation, right, it's all about looking how an ink ages. Esthetic methods, as we commonly refer to it, that has more to do with ink formulation. This is ink formulation independent.
Now, in part, I do agree that certainly different inks are going to have different characteristics and they all age different. It will be really helpful to know a little bit more about when ink formulation in its solvent content levels originally but that's almost impossible. You would have to get all that information from the ink manufacturer and then they have to disclose all the ingredients that they used and that's just not going to happen.
Aside from that, it's -- this is why and

this is the whole purpose and everything I think you've been talking about sort of drives my point home that I said in the beginning, which is this idea of using the two year threshold and there will be inks that are going to vary within those two years, there's no doubt. So when you use the two year threshold that's a lot more -- you have a lot more confidence in that because once we start, if you will, metaphorically splitting the hairs thinner and thinner here then there's a greater chance of making an inaccurate conclusion. So two years is always a nice -- nice to stay with.
So it's like if you were shooting at a target, right, and we use this analogy all the time in chemistry when you're talk about accuracy and precision, right, if you're shooting at a target, two years is a much bigger target so you have a better chance of hitting the target.
So I disagree, once again, with the idea that you have to know the ink formulation. But I don't disagree with the idea that knowing the ink formulation will be great but that will also help you in situations when you get levels that are

below 25 percent to maybe make conclusions that way as opposed to an inconclusive.
Q. Okay. Have you completed your response?
A. Yes.
Q. Do I understand correctly you disagree with both of these conclusions; number one, the formula of the problem ink needs to be identified and number two, the importance of storage conditions of both inks?
A. No, I don't disagree with two. So storage condition, yes. There are what I would sort of qualify more as extreme storage conditions. Is there a difference between storage condition of, you know, in an office versus in a house, no. I would get, you know, 68 degrees versus 70 degrees or 71 degrees, no, that's not going to be a big difference. So it's as you get more drastic and the extreme.
Q. I asked you before about articles in Forensic Science International.
There's another one by Weyermann, Minimum Requirements For Application of Ink Dating Methods Based on Solvent Analysis in Case Work.
There's a statement in that article that

says, "The influence of the initial ink composition on the aging rates of inks is very important. Two aspects must be considered: The compounds (dyes, resins, solvents and additives) and their relative amounts (initial solvent quantity in the ink formulation). Bugler et al actually suggested that the types of resins influenced the aging rates as they observed the presence of acetophenone-formaldehyde-resin in 'slowly aging inks'".
Did you follow me on that?
A. I know exactly what you're saying and I'm very familiar with that.
Q. Do you agree --
A. I'm very familiar with Bugler in that chart that he's referring to with the resins.
Q. So this article is pointing to work by Bugler but the article itself I'm asking about is a Weyermann article, are you with me on that?
A. Yes.
Q. Do you agree or disagree with in the statements in the Weyermann article that I just read?
A. I agree, generally, with what she's

saying, that the resins are important. One of the reasons is that Bugler showed that certain resins will cause inks -- potentially cause inks to be fast aging. So they will age out within three, four months.

Q. Previously you worked in government forensic labs, is that right?

A. Yes.

Q. Did any of those labs maintain a database of inks?

A. Yes.

Q. How many of the organizations you've worked for maintain databases of ink?

A. When I worked at the Secret Service. It's the only US lab that actually maintains a collection in collaboration with the Internal Revenue Service lab.

Q. Approximately how many inks were in the database at the time you last worked there?

A. 11, 12,000 maybe.

Q. Each of those inks will have different aging characteristics, correct?

A. Through that two year period, yes. Once you get to the two year period, they're all

generally going to -- everything will come together about the same.

Q. Are you familiar with the Koenig paper -- Agnes Koenig, Ink Dating Part I, Statistical Distribution of Selected Aging Parameters in a Ballpoint Ink's Reference Population?

A. Yes.

Q. There's a statement in that paper, "It is generally known that ink composition has a significant influence on ink aging. Thus, analyzing representative ink referenced populations is essential to ensure that the selected aging parameter can be implemented in those cases."

Do you agree or disagree with that statement?

A. I don't know -- I don't know what they mean by "ink aging parameter."

Q. In the Koenig article we discussed previously, A Comparative Study of Ballpoint Ink Aging Parameters Using GC/MS. There is a statement in that article that says, "The calculation of R percent value may yield propagation of the uncertainty because two

different samples were used. These results actually showed that the aging parameter, R percentage, did not minimize the variability of measurements, but in contrary did yield increased RSD values for older samples compared to PE quantities. This was not expected from earlier publications."

Are you familiar with that work?

A. I would have to read that more in depth to understand exactly what that's saying. But I -- when was that paper -- the date of that paper?

Q. 2015.

A. So things have changed since 2015 as well too. What I do know is that a lot of the way some of the researches were making -- actually taking their samples in making their measurements created a lot of uncertainty.

Q. We talked about resins a little bit. I want to keep this moving. I understand you have another engagement. Do we agree that the rule of hardness in resins is important?

A. Yes.

Q. Do we agree that low amounts of solvents

may even stay trapped in the ink matrix for years?

A. Absolutely.

Q. There's one more slide I want to show you.

MR. BERMAN: Toni, can pull up the slide that says at 304 days.

(LaPorte Exhibit 6, marked for identification.)

Q. Mr. LaPorte, I'm directing your attention to the exhibit labeled LaPorte Exhibit 6. This is a graphic that was excerpted from the Koenig and Weyermann paper. The citation is under the graph. As you can see on the X axis there's a label, sample age and days and on the Y axis -- vertical axis, we have a quantity indicated of R percentage.

Do you see that?

A. Yes.

Q. So the sample -- the age of the sample in these goes out to 304 days in this chart, right?

A. Yes.

Q. Do we agree that all of these samples

indicated here are above the 25 percent threshold for the window of time from zero days out through 304 days?

A. I don't understand this data. I mean, are these -- are these different inks? Are they the same ink? Is it just one ink?

Q. Does that matter to answering the question?

A. Well, yeah, it does -- I mean, it does -- I would like to understand sort of what I'm looking at. I mean, I will say the first thing is that I would have -- I have serious doubts about this data. I can tell you very rarely do I even see inks with a 40 percent solvent loss ratio. That doesn't happen very often. So when I'm seeing this -- I'm speculative -- not speculative -- but I'm little concerned about the data and how they did the testing. I assume is this ink lines?

Q. This is a chart from the Agnes Koenig anything article, Ink Dating Part I. My question to you is whether I'm reading the chart right that it shows each of these samples -- taking into account your raising the point of what are

the samples, same ink or different ink -- but they all appear to be above 25 percent and as you pointed out, they go as high as about 70 percent on the chart, don't they? Am I reading it right?

MS. GUERON: Objection.

A. What's confusing is you keep saying "samples" and that's why I asked is this multiple samples? I can't answer your question is this a sample that's being tracked, you know, from day four -- day three or four or is this multiple samples?

Q. Okay. Whether -- either case of that is true, right, they're all over 25 percent on the chart; am I reading right?

A. Yes, I'm seeing above 25 percent. Yes.

Q. That's the question is whether I'm reading the chart right.

MR. BERMAN: Let's take a very quick break. I suspect I'm finished with my questioning. I want to take a moment and confirm, okay?

MS. PRIMAVERA: Yes.

(Whereupon, a brief recess was taken.)

Q. Mr. LaPorte, I have two other questions

for you. First of which, is are you aware of any published study that shows solvent loss ratios for inks that are aged to six years?

A. No, I'm not.

Q. And then with respect to the ratio between heated and unheated samples, can that ratio change as time goes on?

A. It depends on when the time -- when you're talking about the time, like, what, from day five to day twenty or -- you know, I don't understand sort of the time difference in when it starts and when it stops.

Q. For any given ink is it fair to say that you can create a chart of the rate of evaporation of the ink?

MS. PRIMAVERA: Objection.

A. So you could in theory do that. So what you're saying is like sampling at different periods of time. That's typically not practical, I mean, in litigation but it can be done.

Q. Setting aside the practical aspect. I'm really asking it as a theoretical question. If you took a compound of ink and you didn't have a supply constraint in terms of you're going to run

out of it, right, you can take that ink and you can put all of it on different papers at the same time and then at one day old you can measure a paper and see how much of it evaporated and set that one aside and then at two days old you can look at your next sample and see how it evaporated and you can plot that in a curve, right?

A. Well, you presented a lot of curves. That's exactly what was done, yes.

Q. You can do the same thing for heated samples of the same ink, right?

A. Yes, you can. Sure.

Q. So in theory if you did that for any particular ink, are you going to find that the curves have the same shape and therefore the ratio between the two curves remains constant or are you going to find something else?

A. Those ratios should generally change.

Q. Okay. And will the change always be in the same direction over time?

A. It shouldn't -- if you're doing the testing correctly, right -- and I'm not just talking -- I don't want to downplay what happens

in a research environment. So a lot of researches they don't -- this idea of sampling one centimeter lines and all this and I've spoken publically about this many times and that doesn't make any sense, right. There's things you can do when you heat if's all coiled -- and I've seen one researcher coil it up and so when you're heating it, it all just spreads to each other -- it contaminates one side to the other side that's coiled up. You have to understand the heating process and how it's done.

In theory, I mean, over a longer period of time the ratio should get -- should get smaller -- the solvent loss ratio should decrease. But, of course, there will be a little measurement uncertainty in there but statistically you would have to do that with multiple samples and then monitor that. And then it will all depend on how the ink is stored and all that as well too.

Q. Okay. So if we measure the ink according to your own methods and we plotted those two curves, are we going to see the ratio continuously decreasing as time elapses, is that

going to be uniform?

A. Generally -- I don't know if I would call it uniform but, generally, there should be -- it depends what the time is because you will have to measurement an uncertainty. But from day -- say day 10 versus day 50, right, then that ratio should get a little smaller.

MR. BERMAN: I have no further questions at this time. Thank you for your time today, Mr. LaPorte?

THE WITNESS: Thank you.

MS. PRIMAVERA: Thank you. I will need this expedited before Wednesday.

(Whereupon, the examination of this witness was concluded at 3:51 p.m.)

ACKNOWLEDGMENT

STATE OF)
: ss
COUNTY OF)

I, GERALD LaPORTE, hereby certify that I have read the transcript of my testimony taken under oath in my deposition of October 7, 2021, that the transcript is a true, complete and correct record of my testimony, and that the answers on the record as given by me are true and correct.

_____
GERALD LAPORTE

Signed and subscribed to before me, this day of , 2021.

_____
Notary Public, State of

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EXHIBITS

CERTIFICATE

I, TONI MUSACCHIA, a Notary Public in and for the State of New York, do hereby certify:

THAT the witness whose deposition is hereinbefore set forth, was duly sworn by me and

THAT the within transcript is a true record of the testimony given by such witness.

I further certify that I am not related, either by blood or marriage; to any of the parties to this action; and

THAT I am in no way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand this 11th day of October, 2021.

TONI MUSACCHIA